



**Does an antenatal educational programme
decrease adverse pregnancy outcomes among
obese pregnant women? A feasibility study in
Kurdistan Region of Iraq**

Aveen F. Haji Mam

**A Thesis submitted in partial fulfilment of the requirements of the
degree of Doctor of Philosophy**

**The school of Nursing and Midwifery/ De Montfort
University U.K**

June 2018

ABSTRACT

Maternal obesity is associated with a wide range of health risks for the mother and newborn (Poston et al, 2011). Investigations and research about the incidence of obesity during pregnancy and its outcomes has not previously been investigated in the Kurdistan region of Iraq. The aim of this study was to explore the appropriateness of an educational programme for obese women and its influence on pregnancy outcomes with a view to undertaking a larger randomised controlled trial and obese women's perceived benefits of the programme. Ethical approval to conduct the study was obtained from De Montfort University Research Ethics Committee and local health care and education provider institutions.

293 pregnant women agreed to take part in the study from three health centres in a large city in the Kurdistan region of Iraq. Obese women (BMI 30 or above) were randomised to one of two groups; 96 women agreed to take part in an antenatal education programme (intervention group), 98 did not take part in the intervention (control group) and 99 women were of normal weight (BMI 18.5-24.99) and did not take part in any education programme (baseline group). Quantitative and qualitative data was collected

The key findings showed that there was no statistically significant difference among the groups regarding; pregnancy induced hypertension (PIH), gestational age at onset of labour (GA), labour outcomes and neonatal outcomes. In relation to Gestational Diabetes Mellitus GDM, findings indicated that the prevalence of GDM was reduced among those obese women who received the educational programme compared to the control and baseline groups. In addition, obese women (intervention) had gained lower weight gain than women in control group but it was not statistically significant. . However, the

common themes which emerged in qualitative arm related to; antenatal educational strategies; problems of transferring an educational programme from one country to another, the socio-cultural context of health education programmes, weight management, and medicalization of birth in Kurdistan region.

This research found that the antenatal education programme appeared to make only a small difference to pregnancy outcomes. One factor which may have affected the results of this study was the diminishing attendance rate among women who were part of the education programme; less than 10% of women attending all six sessions and the majority of women attending 2-3 sessions. The reasons for the diminishing attendance are discussed in the thesis and highlight the importance of developing future maternity health education programmes that are culturally appropriate to the society they are part of; taking account of the perceived role of pregnant women in that culture, the style and format of health education and the place of the health professional in that society. A larger RCT comparing intervention group of obese pregnant women with non-intervention group is feasible, acceptable and recommended. However, prior to progressing to a large scale study, a thorough planning stage is necessary which considers cultural practices and educational strategies. The understandings gained from this research will be transferable to other research within similar settings.

DEDICATIONS

To my husband “Sedeeq” I will never forget your effort

My kids Loona and Mustafa

My Mum and Dad

My Brothers and Sisters

All my family in law for taking care of my kids

I love you Sedeeq

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ACKNOWLEDGEMENT

I would like to thank ALLAH for the power he gave me to complete this thesis and for sending me such supportive people to guide me and help me throughout this research. Without the guidance of these people, this research would not have been finished.

First, I would like to convey my thanks and gratitude to my supervisors Dr. Tina Harris, Professor Mark Johnson, Ms Rowena Doughty for their constant support, advice and encouragement throughout my PhD. Special thanks to my first supervisor Dr. Tina Harris whose guidance, advice and encouragements (both academic and non-academic) were particularly useful during my difficult times. I also thank my second Supervisor Professor Mark for giving me direction and support, for his insights and invaluable advice which have helped me to reach this milestone. I believe that without my supervisors I would have had no clear direction to my research and would not have been able to complete this study. Many thanks to Ms Rowena Doughty for your assistance and direction in the literature review of this thesis.

My thanks go to my local advisor Professor Badiaa Mohamed Najib; head of maternity department at Hawler Medical University in Kurdistan, for her continuous support and help with this research particularly with my data collection process.

I would like to express the deepest appreciation to every participant in the study and the focus groups who shared their information, stories and feedback. Without them, this thesis would not have been possible. I owe my deepest gratitude to all the Health care providers at certain health care centres in Kurdistan region of Iraq, too many to mention. My sincere thanks to all of them.

I gratefully acknowledge Mr Peter Norrie for his help and advice during my statistical analysis. I would like to express my thanks to Christina Weis for her help and personal support during my study period. My thanks go as well to Hajara Alfa for her assistance in English during my study. I must also mention Melanie Petch who helped me while I was writing this thesis. Many thanks to John Fowler for his assistance in organizing the whole thesis. Many thanks to the postgraduate office staff. I am grateful for the opportunity to have been part of the Reproduction Research Group within De Montfort University and for the experiences and knowledge that was shared.

I would like to express my gratitude to my whole family, for their belief in me. To my parents, thanks for your encouragement and moral support of my endeavour and your pride in celebrating my accomplishments; without you, I would not be the person I am today. To my sister and brother in law, thank you for your support and love. My heartfelt thanks also go to my children; Loona and Mustafa who suffered a lot in those times when we had to be apart. Finally, my endless thanks to my husband, who constantly supported me to accomplish my study successfully. And to all people who helped me directly or indirectly to complete this study.

ATTENDING CONFERENCES AND SEMINARS (2012-2016)

1. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015)
YOUR GENETICS LOAD THE GUN`YOUR LIFESTYLE PULLS
THE
2. TRIGGER. Educational Programmes for Obese Pregnancy Women in Kurdistan
Region in Iraq. Poster Presentation _Research Degree Students ‘Poster
Competition and Research Open Day’. De Montfort University, Leicester.
3. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015).
Influence of an educational programme on pregnancy outcomes among obese
pregnant women in Kurdistan region of Iraq. Oral Presentation. Postgraduate
Conference. De Montfort University, Leicester.
4. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015)
YOUR GENETICS LOAD THE GUN`YOUR LIFESTYLE PULLS
THE TRIGGER. Poster Presentation. Postgraduate Conference. De Montfort
University, Leicester.
5. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015).
Pregnancy outcomes among obese pregnant women. Presentation at
Reproduction Research Group Meeting. De Montfort University, Leicester.
6. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015),
Effect of an educational programme on pregnancy outcomes among obese
pregnant women in Kurdistan region, poster presentation, life beyond PhD`
Cumberland Lodge, London

7. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015), Educational programme and pregnancy outcomes among obese pregnant women in Kurdistan region of Iraq, oral presentation, —life beyond PhD‖ Cumberland Lodge, London.
8. Aveen, F. Hajimam, Rowena Doughty, Mark Johnson and Tina Harris (2015) Effect of an educational programme on pregnancy outcomes among obese pregnant women in Kurdistan region of Iraq, oral presentation, ``EMUA conference, university of Lincoln.

Publications

Kazhan Ibrahim, Badiia N. Mohamad, and Aveen, F. Hajimam (2012), Health problems of women aged 45-65 years who accompany clients in Maternity Teaching Hospital, Erbil city, Iraq.1st World Congress on Healthy aging 2012`` Evolution, Holistic aging in an age of change``, Kuala Lumpur convention centre, Malaysia.19th-22nd March 2012.

Sharing findings in a TV programme

Aveen F. Hajimam., (2016) Weight gain during pregnancy and effect of excessive weight on pregnancy outcomes among Kurdish women. Bayani Bash Kurdistan (Kurdistan TV), Miran, (19 august 2016)

AUTHOR DECLARATION

This thesis is the result of my own work. This work has not previously been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Aveen Haji Mam

2018

Signature

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GLOSSARY OF TERMS USED IN THE THESIS

Alternative hypothesis (H1): is the hypothesis used in hypothesis testing that is contrary to the null hypothesis. It is usually taken to be that the observations are the result of a real effect (with some amount of chance variation superposed).

Apgar score: *A number arrived at birth by scoring the heart rate, respiratory effort, muscle tone, skin colour and response to stimuli. Each of these objective signs can receive 0, 1 or 2 points. A perfect Apgar score of 10 means an infant is in the best possible condition. An infant with an Apgar score of 0-7 requires assessment and initiation of resuscitation.*

Body Mass Index (BMI): *The body weight of an individual in kilograms divided by their height in meters squared. A BMI below 18.5 is categorized as underweight, a BMI of 18.5-24.9 as normal/healthy weight, a BMI of 25-29.9 as overweight and a BMI of 30 and above is obese*

Caesarean Section: *Surgical incision into the abdominal and uterine wall to achieve delivery of the baby*

Deep vein Thrombosis: *A condition in which a blood clot form in the muscle of the leg, usually in the calf*

Dystocia: *Failure of labour to progress or obstructed labour, when, even though the uterus is contracting normally, the baby does not exit the pelvis during childbirth due to being physically blocked.*

Fetal distress: *Commonly used to describe fetal hypoxia (low oxygen levels in the fetus), the concern with fetal hypoxia is it may result in fetal damage or death if not reversed or if the foetus is not promptly delivered*

Gestational Age: *Is a measure of pregnancy or age of a fetus or new-born in weeks, measured from the first day of the woman's last menstrual cycle to the date of birth of baby.*

Gestational Diabetes Mellitus: *Is defined as glucose intolerance that was not present or recognized prior to pregnancy.*

Intrauterine growth retardation: *The growth of the fetus is abnormally slow, or there is no growth. Intrauterine growth restriction is associated with increased risk of Medical illness and death in the new-born. Intrauterine growth restriction is also referred to as intrauterine growth retardation*

Macrosomia: *Defined as birth of baby with weight greater than 4000g.*

Multipara: *A woman who has had two or more pregnancies resulting in a viable baby or stillbirth*

Nominal data: *is one that has two or more categories, but there is no intrinsic ordering to the categories. For example, gender is a categorical variable having two categories (male and female) and there is no intrinsic ordering to the categories.*

Normal weight women: *Women with BMI between 18.5-24.9 kg/m² during pregnancy*

Null hypothesis (H₀): *Is the hypothesis that there is no significant difference between specified populations, any observed difference being due to sampling or experimental error.*

Obese women: *Women with BMI more or equal to 30kg/m² during pregnancy*

Ordinal data: *is a statistical data type consisting of numerical scores that exist on an ordinal scale, i.e. an arbitrary numerical scale where the exact numerical quantity of a particular value has no significance beyond its ability to establish a ranking over a set of data points.*

Parity: *The classification of women according to the number of times they have given birth to a baby of more than 24 weeks` gestation*

Pre- eclampsia: *Is new hypertension presenting after 20 weeks with significant proteinuria.*

Pregnancy: *the period between 37 weeks and 38 weeks, six days of gestation is considered "early term." Thirty-nine weeks to 40 weeks, six days is considered "full term"; between 41 weeks 0 days and 41 weeks, six days is "late term"; and 42 weeks and beyond is considered "postterm."*
Pregnancy induced hypertension: *Can be defined as a condition where a woman`s blood pressure is 140/90 mm Hg or greater, after 20 weeks of pregnancy depending on measuring it in two different occasions which 4-6 hours a part*

Preterm birth: *Delivery of a live born infant before 37 weeks gestation.*

Parity: *this is defined as the number of times that a woman has given birth to a fetus with a gestational age of 24 weeks or more, regardless of whether the child was born alive or was stillborn.*

Singleton pregnancy: *A pregnancy with only one fetus*

Stillbirth: *Delivery of a fetus showing no signs of life at 24 or more completed weeks of gestation*

Twin pregnancy: *A pregnancy in which two embryos develop in the uterus at the same time;*

LIST OF ABBREVIATIONS

Abbreviations	Stand for
%	Percentage
BMI	Body Mass Index
CEMACH	Confidential Enquiries into Maternal and Child Health
CMACE	Centre for Maternal and Child Enquiries
CS	Caesarean Section
CT	Computed Tomography
CVI	Cerebral Vascular Disease
DVT	Deep Vein Thrombosis
F	Frequency
FGM	Female Genital Mutilation
GBV	Gender-based violence
GDM	Gestational Diabetes Mellitus
GMU	Growth Monitoring Unit
GP	General Practitioners
GWG	Gestational Weight Gain
HCPs	Health Care Practitioners
HS	Highly Significant
ICU	Intensive Care Unit
IHD	Ischemic Heart Disease
IOL	Induction of labor
IOM	Institute of Medicine
LBW	Low Birth Weight
LGA	Large for Gestational Age
LMP	Last Menstrual Period
Max	Maximum
MCHC	Maternal and Child Health Centre
MIN	Minimum
MOH	Ministry of Health
MoD	Mode of Delivery

MRI	Magnetic Resonance Imaging
N	Number
NA	Not available
NHS	National Health Services
NICE	National Institute for Health and Care Excellence
NICU	Neonatal intensive Care Unit
NOO	National Obesity Observatory
NS	Not Significant
NTDs	Neonatal Neural Tube Defect
P value	Probability value
PHC	Primary health Centre
PIH	Pregnancy Induced Hypertension
PPH	Post- partum Hemorrhage
QUAL	Qualitative
QUAN	Quantitative
RCOG	Royal College of Obstetrics and Gynecology
RCT	Randomized Controlled Trial
S	Significant
SAT	Subcutaneous Adipose Tissues (SAT)
SD	Standard Deviation
SES	Socio-Economic Status
SLT	Social Learning Theory
SPSS	Statistical Package for the Social Sciences
UK	United Kingdom
UIS	UNSECO Institute for Statistics
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNSECO	United Nations Educational, Scientific and Cultural Organization

USA	United States of America
VAT	Visceral Adipose Tissues
Vs.	Versus
WC	Waist Circumference
WHO	World Health Organization
WHR	Waist to Hip Ratio

CHAPTER ONE: INTRODUCTION

1.1 General Introduction

Obesity is defined as an excessive and abnormal body fat accumulation with a body mass index of $\geq 30 \text{ kg/m}^2$ (WHO, 2013; NOO, 2009). It has been recognised as a significant and global public health challenge (Herington et al, 2014; Heslehurst et al., 2011; Caballero, 2007). Globally, the rate of obesity has increased steadily in both developed and emerging countries over the past several decades with little signs of slowing down. According to Nguyen and Lau (2012, p 327), over 1.5 billion people worldwide are overweight or obese and over 40 million children under the age of 5 are overweight. In the United Kingdom for example, two thirds of adults and one third of children were considered either obese or overweight in 2008, with an estimation of 9/10 adults and 2/3 children being obese or overweight by 2050 (Aylott et al., 2008).

Evidence shows that obesity during pregnancy has become a major public health problem in both developed and developing countries (Nascimento et al., 2011; NOO, 2009; Caballero, 2007). The World Health Organisation (WHO) reported that the prevalence of obesity (BMI ≥ 30) amongst women during childbearing, ranges from 1.8 to 25.3% (Natalia and Dimitrios, 2010; WHO, 2006). An example can be drawn from the study of Kanagalingam et al. (2005) which reported an increase in the prevalence of obesity in pregnancies in England. Also, Morgan et al. (2014) stated that one in five women in England are categorised as obese during pregnancy. In addition, the NHS (2016) published recent statistics in UK indicating that 20% of the pregnant women who registered their first trimester were obese (Body Mass Index of 30 or above). While statistics are available in developed countries such as the UK, there is a significant lack

of data in emerging countries such as the Kurdistan region of Iraq. However, one study carried out in Baghdad in 2007 illustrated that 25% of non-pregnant women aged 18 and above, were obese (Al-Tawil et al., 2007).

Obesity in the reproductive period is linked to a wide range of adverse outcomes for both mother and baby such as gestational diabetes mellitus (GDM) (Cordero et al., 2014; Moses et al., 2014), pregnancy induced hypertension (PIH) and pre-eclampsia (Bisson et al., 2014; Dodd et al., 2014; Scott- Pillai et al., 2013), the need for induction of labour IOL (Guelinckx et al., 2010), preterm birth (Althuisen et al., 2013; Phelan et al., 2011), Caesarean section (CS) (Hui et al., 2014; Ruiz et al., 2013), macrosomia (Cordero et al., 2014; Moses et al., 2014; Hui et al., 2014; Murtezani et al., 2014; Scott- Pillai et al., 2013) and admission of new-born to Neonatal Intensive Care Unit (NICU) (Vinter et al., 2011). Obesity during pregnancy has been identified as the most frequently occurring risk factor in maternity care (Nagle et al., 2011). It is crucial for women to be aware of the risk of maternal and foetal complications associated with obesity. Such awareness can be achieved by providing concrete and standardised health education prior to the pregnancy (CMACE/RCOG, 2010), for instance, this is implemented in the UK health system. Currently, there is inadequate evidence indicating how such adverse events can be minimised through specific interventions for women who are obese during pregnancy (Campbell et al., 2011, Heslehurst et al., 2011). Some research studies suggest that lifestyle changes, diet plans and physical activity programmes should be recommended as they show substantial effect in reducing the risk associated with obesity such as gestational diabetes, pre-eclampsia and low birth weight (Harrison et al., 2011, Moholdt et al., 2011).

Unlike developed nations where substantial data has been collected on obesity and its adverse effect during pregnancy, there is very limited data available in the Kurdistan region of Iraq. Mirkhan et al. (2012) found that 29% of women were obese during pregnancy in a health centre in Erbil, the capital city of Kurdistan region of Iraq (Mirkhan et al., 2012). More so, neonatal death rate recorded by World Bank (2015) for Iraq was reported to be 18.4 deaths for every 1000 births, with obesity during pregnancy being one of the leading risk factors, suggesting that the mother's lifestyle is a significant factor for a survival of the baby (Vinter et al., 2011; Leddy et al., 2008).

Factors resulting in adverse pregnancy outcomes are well-documented in the academic literature on pregnancy and obesity, and a review of possible interventions showed that educational interventions on diet and exercise decreased negative pregnancy outcomes (Knight and Foster, 2017). Interventions studied in the literature will be discussed in detail in subsequent sections.

This PhD-project is a feasibility study that serves as a pilot for the implementation of an educational programme to improve pregnancy outcomes among obese pregnant women in the Kurdistan region of Iraq. This study is to evaluate an educational programme. Kurdistan is a patriarchal society where women are still viewed as their father's or husband's properties (Mustafa, 2014; Hardi, 2005), thus they are consumed by their role as care takers to their immediate and extended family. Women in this region are mostly house wives and experience cultural, socioeconomic and family oppression which can put them at risk of unhealthy behaviour during pregnancy, especially those who are less educated. Therefore, there is a need to pilot an interventional education programme which informs women about a healthy lifestyle during pregnancy to assess its feasibility in improving pregnancy outcomes.

1.2 Justifications for undertaking this study:

In 2011, UNICEF reported that maternal mortality in Iraq was 51: 100,000 and the Kurdistan region was included in this rating (UNICEF, 2013). In addition, WHO also reported that the maternal mortality rate in Iraq fell by 29%, from 89 women in 1990 to 63 in 2010 which was suggested to be the direct effect of improvement in the quality of health services provided to mothers, thus decreasing the rate of maternal mortality. The 29% decrease in mortality rate is a head start and may be improved via educational intervention, as recommended by World Bank (2015) and WHO (2013). Maternal and neonatal deaths could be reduced by delivering an early effective intervention during pregnancy (Ray 2004 cited in Lassi et al., 2010). A review conducted by Lassi et al., (2010) suggested the use of community-based intervention packages to reduce both maternal and neonatal morbidity and mortality. This was supported by the study of Mehta et al., (2011), who also suggested the use of targeted interventions to improve pregnancy outcomes (Mehta et al., 2011).

A body of evidence proposed that health education provided to mothers either in their home, primary health centres or hospitals has a significant impact on maternal and neonatal outcomes such as birth weight, pregnancy induced hypertension and gestational diabetes (Vinter et al., 2011; Quinlivan et al., 2011; Thaver et al., 2009). Hence, they should be provided with information and support about appropriate diet and exercise (Furber and McGowan, 2011; Nitert et al., 2011). Furthermore, a guideline by the National Institute for Health and Clinical Excellence (NICE, 2010) recommended the adoption of a balanced and healthy diet instead of dieting during pregnancy to prevent excessive weight gain during pregnancy (Tanentsapf et al., 2011; NICE, 2010). Various research reported the lack of a clear pathway to sensitively raise the issue and offer

appropriate support as factors that serve as barriers to tackling obesity during pregnancy (Oteng-Ntim et al., 2012; Campbell et al., 2011; Bell et al., 2007). One example is the randomised control trial study conducted on obese pregnant women at antenatal clinics in the United Kingdom (Thangaratinam et al., 2012). This study involved two groups of behavioural intervention and standard antenatal care and aimed to assess gestational diabetes and large-for-gestational-age infants. However, no differences were reported between the study groups. Thus, prevention of gestational diabetes and reduction in the incidence of large-for-gestational-age infants will require designed strategies involving other factors than diet and physical activity (Thangaratinam et al., 2012). Furthermore, a systemic review conducted by Muktabhant et al. (2015) concluded that excessive weight gain during pregnancy could be reduced through diet and physical exercise intervention. Campbell et al. (2009) argue that the evidence on the effectiveness of weight intervention programmes in pregnancy is inconsistent and inconclusive. Meanwhile, the LiP study conducted by Vinter et al. (2011) reported that obstetric outcomes between intervention group and control group was statistically insignificant. However, lifestyle intervention led to a higher adherence to the recommended gestational weight gain by the Institute of Medicine. Another significant observational finding was that the average birth weight was 150g higher in the intervention group than in the control group. This was attributed to the effect of physical exercise and activities on placental development (Vinter et al., 2011). This study surpassed that of Thangaratinam et al. (2011) due to the inclusion of an educational package involving personal coaching and dietary guidance in the lifestyle intervention.

Although, Nitert et al. (2011) stated that there is limited evidence regarding the design of effective intervention programmes (effective nutritional and physical activity) and best

practices for managing obese pregnant women, some recommendations include promoting regular exercise and healthy diet in future education programmes (Saskatchewan Preventive Institute, 2010). The findings of Vinter et al. (2011) suggested that including educational strategies as intervention factors could make a difference, and if findings are not statistically significant, observations between study groups should be critically analysed.

In the Kurdistan region, where the researcher originates and has experience of working as a clinical instructor at a maternal health centre in the region for last ten years, she found that the idea of a health education programme for obese pregnant women is a new concept and needs to be explored, designed and developed. Introducing an education programme which aims to control excess weight gain and raise awareness of the risks obese women encounter, could allow women to self-monitor and self-refer to health care services appropriately. An education programme could be integrated with the current health care provision in the region to enhance all women's health status during pregnancy, especially those who are obese. In conclusion, the need for community and individual lifestyle intervention studies for weight management among obese pregnant women, were recommended by several studies (Muktabhant et al., 2015; Vinter et al., 2011; Smith et al., 2008; Krishnamoorthy et al., 2006).

1.3 Personal motivation for undertaking this thesis

In 2005, I became a clinical instructor in a Maternity Teaching Hospital and a number of health centres in Erbil (a city in the Kurdistan region of Iraq). I taught nursing undergraduate students in care provision in the delivery room and the antenatal care unit. As a clinical instructor in delivery rooms, and antenatal health care centre, I realised that there was an insufficient focus on health education. I observed that pregnant women used

health centres as a place to acquire treatment and immunisation, rather than receiving health education about their conditions and needs.

During my master's degree (2008-2010), I had the opportunity to deliver some educational sessions about minor discomfort and nutrition during pregnancy, discussing the relevance of education and women's health. This opportunity gave birth to a dream of educating women on health and its impact on pregnancy. At the end of that study, I realised that women in Kurdistan have little or no knowledge about health education. Most women in this region acquire knowledge from their relatives and friends, most of which is inaccurate. In 2011, I was awarded a grant from the Kurdistan Regional Government in Iraq to undertake a doctorate study to focus on creating an intervention programme for pregnant women. Overall, I wished to acquire relevant knowledge in this field to use it in promoting health quality in my country. To achieve this, I reviewed published literature on the topic of health education for pregnant women and its outcomes and deduced from the literature that educational programmes may have a positive effect on the pregnancy experience and outcomes of pregnant women. I also attended several antenatal educational sessions for obese pregnant women which were run by midwives at the Leicester Royal Infirmary Hospital in UK in order to observe, learn and find a way to merge the knowledge I acquired into the Kurdish culture.

1.4 Study area

This section introduces some of the characteristics of the Kurdistan region of Iraq, focusing on its geography, demography, language, religion and political issues. It also provides an overview of the culture and social context and health services in which the study was conducted.

1.4.1 Kurdistan; geographic and demographic features

The intention of this section is to present contextual information on an overview of Kurdistan, geographic features, the population, Kurdish language, and religion. It will provide the reader with an understanding of Kurdish family structure, culture, marriage, and socio-demographic characteristics. Finally, a description of the health system and health facilities available in the region will be provided.

Iraqi Kurdistan, also named South Kurdistan, is a region located in the North of Iraq, bordering Turkey in the North, Iran in the East, Syria in the West and Iraq in the South (see Fig. 1). Erbil (also called Hawler) is the capital of Iraqi Kurdistan. The region is autonomous and governed by the Kurdistan regional government. The population of Kurdistan is approximately 5.2 million. It presently consists of four governorates (Erbil, Sulamaniya, Dohuk and Halabja). The population of Erbil at present is 1.9 million and according to statistical data provided by the directorate of the Erbil Census and Data Analysis, there are slightly more males than females in the province; Erbil's population has grown by 2.9 percent annually (Erbil Governorate, 2012).



PHOTO 1: Map of Kurdistan and the Kurdistan region of Iraq (Vladimar, 2008; Merip, 2014)

1.4.2 Kurds history

The term Kurd is defined by Asatrian (2009) as an ethnonym, a term traditionally applied to an ethnic conglomeration whose various parts reside in the bordering areas of several Eastern countries (Asatrian, 2009). Until the First World War, most of the Kurdistan area was governed by the Osmania people, and according to the treaty of 1920, the Kurdistan area was granted autonomous status. However, Turkey did not respect this treaty. The treaty of Lausanne further divided the Kurdish area in 1923, where a decision by both Britain and France endowed Northern Kurdistan to Turkey, the Southern part remaining with Iraq and Syria, and the western part belonging to Iran (Mustafa, 2014).

Presently, most Kurds live in Turkey, Iraq, Iran, and Syria with an approximate population of 8 million, 5 million, 6 million and 4 million, respectively. They also live in European countries, the USA and Israel (Asatrian, 2009 p.2). Therefore, Kurdish people are recognised as the only nationals in the Middle East without a country.

The history of the Kurdish people revolves around invasion and war due to the richness in its natural resources such as the vegetation, beautiful scenery, mineral resources, and most importantly crude oil. For this reason, Kurdish people have witnessed war in different forms; some of the effects are still part of their life. For example, the impact of the Halabja chemical attack left women with challenges during pregnancy and congenital abnormalities among new-borns (Fatehi, 2012).

1.4.3 Kurdish language

Kurdish is regarded as one of the Indo-European languages in the Iranian family of languages, similar to Persian (Iranian language). Kurdish has also borrowed many Arabic words (Mustafa, 2014; Zaken, 2007). There are two Kurdish dialects, Kurmanji and Sorani, each with sub dialectics. The former is used by the Kurdistan of Turkey and Syria

and the latter by Kurdish people in Iraq and Iran (Asatrian, 2009 p.2). However, the Kurdish language employs different rules of language structure than other Indo-European languages, where the tenses are a product of verbs conjugated by endings indicating such tense. The people are mostly bilingual or multilingual, speaking the language of their respective nation of origin, such as Arabic, Turkish or Persian as a second language alongside their first language (Kurdish). Traditionally, Kurds did not use surnames, but nowadays most use a tribal title or their geographical location as a modern surname (Saarinen, 2013). An example could be drawn from the people residing in Barzan, a part of Iraqi Kurdistan which is the place of origin of the current president (Massoud Barzani) (Mustafa, 2014)

1.4.4 Kurdish religion

Kurds are followers of numerous religions and faiths, such as Islam, Ahl-I Haqq (Yarsan), Yazidism and Christianity. Nowadays, most Kurds are Sunni Muslim, belonging to the Shafi School. There are also Kurds who are Shia Muslim, being the minority. At first, the Kurds resisted the Islamic invasion during the seventh century AD. They gave in after the Islamic victory near the modern-day Iraqi city of Sulamaniya in AD 643. Yazidism is a small religion that combines aspects of Islam, Judaism, and Christianity (Asatrian, 2009). In general, the Kurds are moderate and religiously tolerant. For example, fasting, which belongs to Islam, connects the Kurds, but the length varies according to the religious conviction (Saarinen, 2013, p 3).

1.4.5 Kurdish clothes

Clothes used by Kurdish women are mostly loose. Kurdish women are not veiled except during parts of the marriage ceremony where they completely cover their elbows and

knees. However, they are not allowed to wear revealing clothes, even without a headscarf. Not abiding by this requirement is considered an issue of family honour (Mustafa, 2014). Traditionally, Kurdish women wear colourful skirts and blouses. Men wear baggy colourful trousers with a plain fully sleeves shirt, which are tied at the elbow. Bright-coloured vests and sashes (often red) are worn over the shirt. A man can wear a silk blue turban on his head, and often complete his costume with a dagger worn at the waist. Kurdish men usually shave their heads and wear long moustaches and women wear bright, colourful and heavily embroidered clothing. The traditional Kurdish shoe, the *klash*, is a soft crocheted mocassin with a flexible sole (Hassanpour, 2001). The use of traditional attires is becoming rare among Kurds. Kurds generally dress like the people of the countries where they live. In Iran, women must wear a cloth covering their hair and body. In Turkey, on the other hand, the government has banned women from covering their hair in universities and public jobs; they are required to wear more Western-style clothing. In Iraq, men wear woollen coats and vests, checkered head-scarves, and baggy trousers. Women wear Muslim-style dress, often with baggy trousers underneath (John and Morris, 1992).

1.4.6 Kurdish culture and family structure

The basic principle of Kurdish culture is hospitality. The Kurds are a very welcoming and friendly people. They embrace both genders mixing and gathering during traditional celebrations such as engagements, marriages, religious festivals and Newroz (Kurdish new year celebrated every 21st March of the year), in contrast with Arab culture, where men and women are separated especially during meals (Muhamad, 2013). Kurds have respect for each other and the young ones start taking up responsibilities such as small chores at an early age (Hardi, 2005). It is customary to highly value the decision of the

elder and in a situation where there is no qualified male to take the role of a leader, an elderly woman will take up the role. This also happens in Indian culture (Ewars, 1997). Historically, Kurds are tribal individuals and tribal traditions continue to affect their daily experiences, as well as nontribal Kurds, who live in both rural and urban areas. According to tribal ideology, there are different family ties where families are closer to their first cousins than the second cousins. When conflict breaks out, they unite to face the opposing group. However, families and their first cousins can unite against their second cousins and distant relatives. And when there is conflict between a family and first cousins, nobody nor any other group interferes. Kurdish kinship happens in two ways: through blood or through marriage, which is also seen in Arab culture (Mustafa, 2014). A Kurdish family can be regarded as an extended family which includes many generations under an umbrella and there is a strong relationship between family members (Saarinen, 2013). Children learn how to respect their elders at home and they are expected to be obedient and submissive. Traditionally, they do not contest the decisions of their parents. A strong relationship between sisters and brothers can be noticed, even after marriage.

Every birth in a Kurdish family is recognised with joy and breastfeeding continues until the baby is two years old. In rural households, mothers do not discipline their children in the presence of their in-laws. Boys are circumcised between the ages of six and ten. Kurds select a family from their neighbours who will comfort the young boy during his circumcision, with the hope that the two families will have a lifelong relationship. As regards female circumcision, in 2010, WADI published a study on Female Genital Mutilation (FGM) in the Kurdish region of Iraq, which found that 72.2% of women and girls were circumcised. In 2016, UNICEF report mentioned Iraq as one of the 30

countries practising FGM. The practice of FGM was shown to be high in Kurdish region of Iraq with a percentage of 51%-80% (UNICEF, 2016).

1.4.7 Kurdish culture and Marriage

Traditionally, women were treated as property and marriage was used as means of business, using women as collateral, security, bond, or pledge (Mustafa, 2014; Hassanpour, 2001). In the past, women in Kurdish society did not have land of their own so marriage was the only way for them to be supported and as such were completely dependent on marriage. A woman begets respect and is treated as an adult by the community after marriage and her social, economic and sexual potential transfers from her family to her husband's family, a common practise in most Pakistani culture (Ali et al, 2011). Sex in the Kurdish traditional view is not allowed before marriage and a couple cannot live together before marriage. Furthermore, most marriages are pre-arranged mostly by the tribal head, even before the birth of the child, particularly among people living in rural areas (Begikhani et al., 2010). Individuals are also forbidden to marry non-Kurds or someone outside of their tribe (Saarinen, 2013). In some cases, marriage can be postponed for girls due to a shortage of labour in the family. Generally, Kurdish women marry at a young age (before the age of 20 years), based on a belief that they will become settled and the family honour protected. A 2011 survey, conducted by Al Alak et al. (2012) in the Kurdistan region, showed that around 10% of women between the age of 15-19 years are married, although, this percentile did not cover non-registered marriages, which occur frequently in this region. There are different types of marriages within Kurdish culture, the majority have arranged marriages. First of all, when women are kidnapped or unmarried girls taken by force (planned in advance between families), which is a common practise in this culture, the kidnapper will have to give his sister or

cousin to the kidnapped girl's family in order to recover from social and economic damage which mostly has to do with the family honour. Secondly, marriage exchange is also a very common traditional practice among Kurds. For example, the head of a family gives his daughter to another family head. Another instance is the circle marriage, where family A give their daughters to family B and family B have to give their daughters to family C, and finally family C have to complete the circle to give their daughters to family A. Alternatively, sisters can be exchanged in the circle marriage. These forms of marriage have nothing to do with religion, but form part of the culture where women are use as unemotional objects of transaction. These forms of marriage can be seen among Australian Aborigines and American Subarctic peoples (Evans, 2015). Thirdly, a divorced or widowed woman does not have another option but to marry a married man as a second or third wife. In this case, the husbands are mostly wealthy men, as it is expensive to raise more than one family. In addition, men in this region are not allowed to raise someone else`s children, so most widows remain unmarried or marry the brother of their deceased husband as his first, second, third or fourth wife so as to take care of the children and property. As for a widowed man, he can marry his wife's younger sister in order to guarantee the wellbeing of children and ensure that the inheritance of land stay within the family. Lastly, infertile women usually face ridicule and in most cases are divorced or their husbands marry more wives, because large families are very important for Kurds. However, for infertile men, the women have to stay with him for their entire life. These events highlight certain aspects of Kurdish family traditions. Nowadays, the Kurdish people can choose their partner, but arranged marriage is still common practise in rural areas (Saarinen, 2013; Begikhani et al., 2010). All the above-mentioned forms of

marriage are also reported as common practise in most Islamic communities such as Pakistan and Arabic speaker's communities (Mustafa, 2014).

Regarding marriage patterns, the groom has to pay an amount of money to the bride's father. This system is called *next* in Kurdish, meaning "bride price". The money is given to the bride's family for jewellery, the wedding ceremony, a rifle, a revolver, household goods, electronic equipment, and hoofed animals. Sometimes, the bride's family uses the bride price to get brides for their sons. In addition, the groom has to cover the expenditure of renovating the bride and groom living room/quarters or building a new home. The "bride price" varies according to the groom's family socioeconomic status and who the groom is marrying. For example, the sum paid is larger if the groom is an old widower or the girl is a second or third wife.

A couple in love cannot marry each other unless their families agree. As a result, some girls, especially in urban areas, threaten their parents that they will elope with their lover. However, eloping and kidnapping may have far more serious consequences. It may result in inter-lineage and intertribal feuds, since it is believed that the woman's honour is stained; she is no longer considered a virgin, and cannot be returned to her family (Mustafa, 2014; Hardi, 2005).

In Kurd tradition, blood feuds are intertribal affairs. When a Kurd is murdered by someone from another tribe, not only does the lineage of the dead man, but the whole tribe comes together for an extra-judicial form of punishment, usually provoking countermeasures that lead to escalated tribal warfare. Settlement between the tribes can be a lengthy process and is pursued until an agreement is reached about the payment of

bez, blood money, to the relatives of the victim. Blood feuds are more widespread in the Kurdistan region of Turkey than in other parts of Kurdistan, and such incidents decrease as the power of tribal leaders decline (Ahmetbeyzade, 2000).

1.4.8 Women position in Kurdish Society and honour of Family

Kurdish women are still used to resolve conflict between two tribes. The most important role of women within this society is to look after children, undertake household chores, always stay at home and always has to be accompanied by immediate relatives when running errands or attending events. In some homes, women are expected to eat after men, and their sitting quarter is separated from that of the men (Salim, 2003). Many women's noses were cut by their family as a punishment for mingling or associating with other men (who are not their relatives). In addition, the murder of a female family member typically happens when a woman is accused of having a sexual relationship with a man other than her husband. There have also been cases of women being killed simply for falling in love, and this phenomenon still occurs even among the present Kurdish diaspora. In Kurdistan, mobile phones and the internet have widened the opportunity for social interaction between young men and women, beyond the censorious eyes of male relatives. But the government's best achievement was to amend the law that previously either let off perpetrators of honour killings, or handed down light sentences. The new law, which was approved in 2008, regards honour killing as murder though implementing the law remains a challenge due to a lack of law enforcement in the region. Sometimes a woman gets killed and no one is arrested to account for it (Neurink, 2014). Pakhshan Zangana, the leader of a new council that aim to improve the lives of women, announced by the government on 25th November (2012), states that honour killing is a cultural issue

that cannot be solved overnight and will only be resolved when the people's understanding of the concept of honour changes (Neurink, 2014).

1.4.9 Kurdish Women political changes

The politics and economy of both Iraq and the Kurdistan Region have affected a number of changes in both the status of Kurdish women and the demands made of them over the last 50 years. From the 1970s, as the economic stability of Iraq improved, so did the role and position of women, especially in the Kurdistan region due to rural-urban migration to seek employment.

The country's industrial sector developed in urban areas and urbanisation and lifestyle changes occurred as a result. Urbanisation had a key impact on the current status of women in Kurdish society, providing them with jobs in various industrial sectors such as knitting, sewing, chicken farming, hospitals, education and governmental organisations. Therefore, leading to changes and abolishment of some cultural norms, such as travelling alone without the company of immediate relatives (Mustafa, 2014).

Unfortunately, the political situation during the 1980s, during the war between Iraq and Iran, saw a change in women's status. Kurdish (as well as Iraqi) women were asked by the Iraqi government to bear children and extra money was given to those families who produced more children. Family planning was prohibited. These issues led to most women leaving employment and staying at home. Moreover, most of the organisations where they were previously employed were closed resulting in loss of jobs. Furthermore, during this period, the government interrogated some women due to the connection between their male relatives and the people of the mountains. In the 1990s, when the economic sector of the Kurdistan region was performing poorly, most women started to engage in manual work, mostly as house help in the homes of the rich (Salim, 2003).

The traditional view and role of women in the Kurdish society was taken into consideration during the process of designing the intervention programme for this project.

1.4.10 Socio-demographic characteristic in Kurdistan

It is believed that education is one of the cornerstones for raising the status of an individual in his or her society (Boyden and Ryder, 1996). Data released by the UIS, showed a steady rise in literacy rates for adults and youth worldwide. Although the data indicates that young women (aged between 15-24) are making the strongest gains, they are still behind young men. In 2011, 87% of young women had basic literacy skills, while the percentile reported for men was 92% (UNESCO Institute for Statistics, 2015). Overall, data provided showed that more than half of countries have youth literacy rates of 95% or higher. The literacy level is high in the Kurdistan region of Iraq but there is inequality between male and female, particularly with respect to access to education. A survey conducted by Sindi (2013) on the literacy rates in Kurdistan showed that 94.1% of male and 84.9% of female can read and write. In addition, the rate of illiteracy for children aged 12 or above is greater than 26.3%, Erbil 26.6%, Dohuk 30.7% and Sulamaniya 23.4%, with urban areas having better literacy rates compared to rural communities (23.8% and 38.4%).

According to Al Alak et al., (2012), the level of literacy among females increased from 64% in 2006 to 78% in 2011 (Al Alak et al., 2012). In 2000, a comprehensive survey done by the Kurdistan Ministry of Education with the help of an international organisation, which aimed to estimate the level of literacy, showed that out of 34% who were found to be illiterate, 60% of them were female (UNESCO, 2015). So women in Kurdistan are still struggling for equal access to education and equal status with men (Neurink, 2014). Inequality in education for women is also seen in neighbouring Arab

countries; Manasra (2003), highlighted that families preferred to educate their sons in areas of sciences such as medicine and engineering rather than their daughters, who were directed to study arts and social sciences (Manasra, 2003). The Kurdistan Ministry of education has attempted to decrease the level of illiteracy, by providing facilities to educate 340,000 people in the population. There are many reasons behind the level of illiteracy among Kurds and especially among women. Schools are not widely available and girls are often needed at home for household duties (Kurdistan Board of Investment, 2009). In addition, there are cultural views on women being indoors to protect family honour. Consequently, families do not send daughters and sisters to schools far away from home (Sindi, 2013). Educating women in this region is important to tackling this inequality; women need to be educated to have knowledge to improve their health.

Table (1.1) Educational level among 12-29 years old in Kurdistan 2014 - 2015 (Sindi, 2013)

Area	Illiterate	Read and write	Primary	Intermediate	Secondary	Institute	BSc and Above
Region	12.6	17.1	31.9	22.2	9.9	3.1	3.1
Erbil	14.2	15.2	29.7	23.9	10.1	2.8	4.2
Dohuk	17.8	16.3	31.7	18.3	9.2	3.6	3.2
Sulamaniya	7.7	19.3	33.8	23.4	10.4	3.1	2.2

According to Al Alak et al., (2012), in Kurdistan, the average study years in school is 7.8 years which is similar to Iraq. Erbil, Sulamaniya, and Dohuk having an estimate of 8 years, 8 years, and 7.8 years and 7.7 years, respectively. Also, the report from Ministry of Planning showed that, in the academic year 2014-2015 (Mop, 2015) 5,950 schools available in Kurdistan region were enrolled with 115547 teachers and 1,555,042 students. The rate of registration of students at primary schools was around 95.5% better than other parts of Iraq. Furthermore, 64% of students finished primary school at the age of eleven

years old, while 90% of students were between 12-17 years old when they start to attend secondary school.

Sindi (2013) reported the statistics on poverty for Kurdistan and its neighbouring regions. In Kurdistan region, poverty was reported to decrease from 4.7% in 2007 to 3.5% in 2012, whereas, in Erbil the rate reported is 3.6%, 2% in Sulamaniya while around 5.8 % in Dohuk (see the following table) (Sindi, 2013).

Table (1.2) Percentage of poverty in Kurdistan region

	Region	Erbil	Dohuk	Sulamaniya	Iraq
% poverty	3.5	3.6	5.8	2.0	18.9
Own house	74.1	75.4	71.0	74.2	70.9
Own car	49.8	55.4	51.6	44.9	31.7

1.4.11 Health sector in Kurdistan region of Iraq

Health care is provided by the ministry of health (MOH) in Kurdistan. This free service is responsible for rendering good quality care and ensuring the availability of health care to the Kurdish people. Historically, the formal health care system in Iraq began in the 1920s, but the Ministry of Health (MoH) in Iraq was established in 1952 and its organisational structure was formalised in 1959. This organisational structure has changed little since its establishment (WHO, 2004). The health care system in Iraq adopts a hospital-oriented and capital-intensive model that requires large-scale imports of medicines and medical equipment (Anthony et al., 2014; Alwan, 2004). In the 1970s and early 1980s, Iraq witnessed spectacular social and economic development leading to the development of an efficient health system that was considered one of the best in the Middle Eastern region. This period was associated with improvements in several critical health outcomes (Alwan, 2008; Al Shorbaji, 2006). *“However, the capacity and performance started to deteriorate during the 1980s and 1990s as a result of war and*

economic sanctions leading to a serious decline in indicators of population health outcome to levels comparable to some of the least developed countries” (Ali and Shah, 2000, p56). With its establishment in the early 1990s, the MoH of Iraqi Kurdistan Regional Government adopted the basic organisational structure and system of the Iraqi MoH. In the public sector, the health services are provided through a network of primary health care (PHC) centres and hospitals where services are provided at very low cost to all people with equal access for all. However, this led to overuse of health services and overcrowding of health facilities with some adverse effects (Alwan, 2004; Kreisel, 2001). The significant devastation of the health system in Kurdistan region of Iraq by the events of the last few decades together with latest demographic, political and economic evolutions, have made the necessity for adopting a new health care system increasingly recognised (Al Shorbaji, 2006). The health system needs to go through a process of continuous change and improvement in order to be able to cope with different changes in the health and population environments and to appropriately respond to different challenges and needs (Figueras and Saltman, 1998). (See appendix 1.1 & 1.2 Demographic statistics of Kurdistan region, health facilities in Erbil governorate and primary health care centres).

Health services in Iraq, particularly in Kurdistan, have faced persistent problems because of recurrent war and internal conflicts over the past two decades. Primary health care centres are continuously confronted with insufficient supplies, shortage in health care workers and lack of supporting services.

Iraq, including Kurdistan, is regarded as having the second highest fertility rate in the Arab world. The average fertility rate in the Kurdistan region is about 3.1 children per family. Sulamaniya has the smallest fertility rate at approximately 2.3 while Dohuk has

the greatest (3.9) (Whitcomb, 2014). There are 38 per 1000 teenage pregnancies among women in Kurdistan region, compared to the rest of Iraq, where 90 teenage pregnancies occur per 1000 births (Al Alak et al., 2012). 92% of women delivered their babies under the attendance of qualified nurses. In comparison to neighbouring countries, this is better than Egypt (79%) but less than Turkey's (95%). In regards to family planning, 64% of women used family planning in 2011, which was better than Egypt and Turkey, also beating countries in western Asia, standing at 56% in 2010. Also the rate of children immunised in 2006 was about 47%, and that increased to about 64% in 2011. 7% of children from Kurdistan region were underweight when compared to other parts of Iraq which have a 5% underweight (Al Alak et al., 2012). A Survey conducted by UNICEF with the help of Kurdistan region statistics office (2011) reported that mortality rate in Kurdistan region was 32% of children under 5 years old, while in Iraq was 38% in 2011. In Iraq including Kurdistan region, mortality rate of new-borns is 27 per 1000 from 1990s, but the recent data estimate around 18 per 1000 in first 28 days of their life (Al Alak et al., 2012). That means 85% of children die within the first 28 days of their life, implying that Iraq including Kurdistan is still among those countries where the maternal and neonatal mortality is high. So offering women health education during pregnancy could be an important factor in helping to reduce this rate (Al Alak et al., 2012).

Health services, including maternal health services, have faced constant problems after wars and internal conflicts in the last decades. According to the UNFPA (2014), Iraq is included among 68 countries that have 97% of maternal deaths worldwide. This is related to inadequate birth practices, lack of emergency obstetric care and high prevalence of anaemia among pregnant women. In 2006, 60% of women delivered their babies at hospital but this number reached 76% in 2011 (UNCEF, 2011).

Most women in this region are mostly uneducated and unemployed, thus have poor economic status and experience more gender-based violence (GBV). Therefore, women are underrepresented in the higher levels of public sector and government, and participate in small numbers in the labour force (Salim, 2003). Women's situation needs reforming and enhancing by educating women and informing them about their needs and health, especially during pregnancy. This can be achieved by providing antenatal care facilities and robust relevant information and services at this stage of their lives. Generally, antenatal care can be defined as care that is routinely offered to all pregnant women equally at primary care level from screening to the delivery of the baby (NHS, 2014). At this stage, pregnant women will receive support and information regarding issues relating to pregnancy, delivery and parenthood (Shabila et al., 2010). In addition, it is beneficial for early diagnoses of high-risk pregnancies and offering periodic assessment (NHS, 2014).

The strategies for antenatal care have improved over the last two decades in this region. Most care providers inform and sensitise pregnant women on various issues such as nutrition, signs of high risk pregnancy and its complications, immunisation during pregnancy, care of new-born, as well as family planning. The provision of antenatal care is relatively high in Erbil city with 84% of women receiving antenatal care at least once during pregnancy (DOH, 2012). Around 40% of women have four visits and about 80% of them sought antenatal care for the first time during first and second trimester (Al Alak et al., 2012). The problem in this region is not related to the number of visits, but the quality of services provided for pregnant women. There is no room for antenatal classes. Women use health centres for registering their pregnancies, immunisation, sometime taking blood pressure for those with history of hypertension and seeing physician for

referral to clinics for further investigation (urine and blood test). This is an opportunity for health care providers (HCPs), with the help of the health director to identify women at risk and provide information regarding health promotion.

As stated before, antenatal care has positively contributed to pregnancy outcomes. In this region research around pregnancy outcomes and their associated topics has not been done scientifically. Therefore, at the end of this study the researcher discusses the status of antenatal care and the issues around health education to participating women in this region.

1.4.12 Pregnant women within Kurdish society

Generally, in Kurdish society pregnancy is considered as a normal process and socially defined as a time to make the family bigger. The new baby is regarded as very important because it will play a vital role in providing support to the family in the future. In the Kurdish community, pregnant women continue with their normal household chores such as cleaning, cooking, and looking after their children and avoid work involving heavy lifting.

In the Kurdish social context, from the researcher's experience as a woman from this region, big sized pregnant women, alternatively obese pregnant women, are recognised as "good mothers" who will have nice and healthy babies. Whereas lean and skinny pregnant women will have unhealthy small babies, which are traditionally called 'cat's babies'. Therefore, there is pressure on pregnant women to have more food than they necessarily need; the principle of "eating for two". The inability of pregnant women to over-eat results in heavy scolding from family members. In addition, in this society, women are made to believe that obese mothers are more likely to have the ability to

breastfeed their babies successfully and their breastmilk will contain more vitamins and nutrients than normal weight mothers.

1.4.13 Obesity and Kurdish society

In the past, the majority of people in the Kurdistan region lived in villages and sustained their lives through farming and animal husbandry, especially goats and sheep. Marketing products such as leather, goat's cheese and wool from their flocks. Women make carpets and clothes as goods for sale at the market. In urban areas, some Kurds, mostly the less educated, have menial occupations as bricklayers, butchers, cattle dealers and small traders, while the educated Kurds work in governmental and non- governmental bodies such as the education and banking sectors (Hassanpour, 2001). In the 1980s, during Saddam Hussein's regime (president of Iraq from 1968 to 2003), over 4,000 villages were destroyed and the former inhabitants coercively relocated to urban areas. The end of Saddam Hussein's regime brought significant improvement and development to the Kurdistan region and its economy. Trade and businesses started, thus urban development occurred with investment leaning more towards small business companies instead of farming and agriculture. Kurds abroad also contributed to the growth of the Kurdistan economy by investing and sending money earned back to Kurdistan. Consequently, people have greater purchasing power that has had a tremendous effect on their lifestyles. Prosperity in this region brings about dramatic changes in the lives of the Kurds, some of which influence their health negatively and the people are mostly unaware of these health negations. Among the health issues in this region, obesity has increased dramatically. However, there are no official figures which document the marked changes in this region, particularly within the health sector (Foran, 2008). From the researcher's experience and observation during her clinical career, another contributing factor is an increase in

available sedentary jobs due to improved technical development and increased availability of skilled jobs in present era, in both governmental and private organisations. Thus, most educated Kurds have more than one employer and require easy transportation between jobs using personal vehicles.

Obesity has become an epidemic worldwide; the Kurdistan region of Iraq has not been excluded from this. According to a local health care practitioner (HCP), a steady increase in obesity has been observed among local residents, and unaccustomed with this, the diagnosis is received with a shock from people when informed. According to Mirkhan al. (2012), 29% of women in the Kurdistan region are overweight or obese. Mirkhan and her colleagues also state that urbanisation may be a contributing factor to this development. In addition to that, most patients claimed not to be informed by their health care providers about the issues of obesity and its consequences. They further pointed out that because doctors themselves are often overweight; they do not make a move to educate patients about obesity and adverse health consequences (Whitcomb, 2014). Another potential influencing factor behind this epidemic in Kurdistan is associated with the government, where government bodies do not seem to be aware of this issue, as such do not design tailored programmes to educate the masses (Whitcomb, 2014).

1.5 Obesity as a concept

Obesity can be defined as an imbalance between energy intake and energy expenditure (Olson and Blackwell, 2011). The concept of obesity is synonymous with terms such as overweight, fatness, adiposity, chubbiness, plumpness, fleshiness, pudginess and corpulence (Ruyak and Corwin, 2013; Bray, 1978). These terms have been used interchangeably with obesity in the literature. Some of these words are considered inappropriate to be used in research, as they are considered derogatory with

discriminatory overtones. Therefore, the researcher chose to use the term obesity throughout the study thus avoiding such inappropriate language overtones.

Ideally, obesity should be defined by the amount of excess fat that increases health related risk factors. However, in practice it is not possible to have a single ideal definition of obesity based on excess fat measurement for use as a population based estimate for three reasons. An ideal definition needs an exact measurement of excess fat, which is difficult in practice. Secondly, health risks associated with obesity increase on a continuum not at a particularly defined cut-off point and thirdly, the effect of excess fat on health varies among individuals and populations (Chu, 2011).

1.5.1 Classifications of obesity and its measurement

Obesity can be identified by using different measures such as Body Mass Index (BMI), Waist Circumference (WC), skin fold thickness-biceps, triceps, subscapular, suprailiac, Dual energy and X-Ray absorptiometry, Computed Tomography (CT) and Magnetic Resonance Imaging scan (MRI). The most common definition of obesity used was based on BMI (Burkhauser and Cawley, 2008). This section will discuss the classification of obesity and its measurement, causes of obesity, inequalities and stigma of obesity, health effects of obesity and strategies for tackling obesity. Finally, obesity and women's health will be discussed.

BMI is determined by calculating a person's weight in kilograms divided by height in meters squared. Most literature suggests that an individual with a BMI of 30 or more is regarded as obese. Based on BMI, obesity can be further subdivided into: class I obesity with a BMI range between 30 to 34.9, class II obesity having a BMI range of 35-39.9 and class III or morbid obesity characterised with a BMI of 40 and above (Despres, 2012; WHO, 2003). In most research, BMI is used as a tool for assessing obesity, with evidence

suggesting individuals with a high BMI level have adverse health outcomes compared to the non-obese (Andreasen,, Andersen, & Schantz, 2004; Burkhauser and Cawley, 2008;). BMI is widely used around the world so the researcher could compare data obtained with that published. Aronne and Louis (2002) confirmed that this method of measurement is easy and quick to use in busy clinical areas, because it only requires height and weight measurement for calculation (Shugart et al., 2009). In addition, BMI tends to be used in health care settings when planning care packages (Aronne and Louis, 2002).

Even though BMI is easy to calculate, (Shugart et al., 2009), it is challenged as a suitable indicator of obesity (Scafoglieri et al., 2013; Despre's, 2012; Shugart et al., 2009; Rees et al., 2008; Burkhauser and Cawley, 2008). According to Flegal et al. (2010), BMI is significantly affected by age, gender and ethnicity and there needs to be adjustments made for these factors. Therefore, BMI may give false results. Specifically, it can over-estimate body fat among professional athletes or under-estimate body fat among elderly persons who have lean muscles (Rees et al. 2008), and does not distinguish between fat-free mass, like bone and muscles, with fat (Burkhauser and Cawley, 2008). Furthermore, BMI does not discriminate between visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT) (Scafoglieri et al, 2013) and research has shown that storing fat around the waist (in visceral adipose tissue; VAT) is more dangerous for individual health than around the thighs and legs (in subcutaneous adipose tissues; SAT). However, BMI cannot measure both SAT and VAT, since fat cells actually regulate metabolic functions, and expert opinion is that fat cells in the belly release large amounts of fatty acids, which can destroy and increase blood sugar and insulin metabolism in the body (Woolston, 2016). Burkhauser and colleague (2008) discouraged the use of BMI and proposed the use of

other techniques such as waist circumferences and waist to hip ratio (Burkhauser and Cawley, 2008).

Waist circumference (WC) and waist to hip ratio are regarded as the best indices for assessing abdominal obesity. Both are designed to measure fat distribution throughout the body, especially around the abdomen (Scafoglieri et al., 2013). The rationale behind the use of WC is related to its accuracy for measuring visceral adipose tissues (VAT) (Berentzen et al., 2012). Waist circumferences can be assessed by setting the tape measurement to the top of right iliac crest. The tape should be comfortable but not too tight around the skin and detained parallel with the floor. The measurement should be conducted in normal respiration. Aronne and Louis showed that women with a WC greater than 35 inches and men with WC greater than 40 inches are considered as a high-risk WC (Aronne and Louis, 2002). Therefore, by using waist measurement, health care practitioners could assess the general body fat distribution, which has a vital role in obesity adverse outcomes. Waist circumference (WC) classifies obesity into three general categories: central obesity, peripheral obesity and generalised obesity. Central obesity means having a waist to hip ratio (WHR) in the upper 95th percentile. Peripheral obesity means the individual holds a WHR in the lower 5th percentile, and generalised obesity is defined as individuals having a weight between the 5th and 95th percentile (Rees et al., 2008). Wendland et al. (2007) considered WHR a better indicator of obesity-related health risks than BMI in the non- pregnant general population.

Another method used to measure subcutaneous fat under the skin, including skin-fold thickness, biceps, triceps, subscapular, and suprailiac, is by grasping the fat using callipers. The disadvantage of this method is the unreliable measure of intra-abdominal adipose tissue (NOO, 2009).

Computed Tomography (CT) and magnetic resonance imaging scan (MRI), are two techniques which can be used in measuring fat distribution and MRI has the advantage of avoiding radiation exposure, which is an important consideration during pregnancy (Hu, 2008). Apart from above indices, others include the waist to height ratio, the abdominal sagittal diameter and the conicity index. Despite their accuracy, these indices are often more difficult to use because of scarcity of relevant valuable literature, in addition to being expensive (Scafoglieri et al, 2013)

In Kurdistan region, using weight indicator including BMI, waist circumferences and waist to hip ratio has not yet become common practice and most health care providers are not aware of these indicators. They use weight alone as an indicator of measuring weight gain or loss. In this project, the researcher utilised BMI measurements, whilst acknowledging the limitations of its use in assessing the level of risk of obesity. The other methods mentioned cannot be used due to the cost involved, associated risk and disadvantages towards pregnant women such as the waist and hip circumference measurements was not possible among pregnant women, due to the growing foetus within the abdomen.

At the end of this study, the researcher intends to introduce the use of BMI in maternity care settings and to contribute directly/indirectly to the provision of height and weight scale at various primary health care centres in the region of study and introduce a general course about measuring obesity through BMI indicator to health care providers. The aim is to create awareness in individuals and health care providers about classification and risks associated with being overweight and obesity. Within this research, BMI was used as a weight measurement indicator, which allows comparison with those reported in literature and ease in practice.

1.5.2 Causes of obesity

Obesity has been considered as the fifth leading indirect cause of death, and it substantially contributes to the morbidity and mortality of several chronic diseases and disabilities (WHO, 2012; Kongubol and Phupong, 2011). Familiarity with leading causes of obesity will help to seek suitable strategies to minimise the consequences of obesity and furthering this epidemic. According to recent studies (Benkeser et al., 2012), the fundamental cause of obesity is related to individual behaviours which involves an imbalance between calorie intake from foods and/or drinks and energy expenditure through body metabolism and physical activity. There are abundant debates and arguments about which of the above behaviour are more responsible for being obese, but so far no innovative solutions have been produced (Benkeser et al., 2012). Edwards et al. (2006) stated that, this imbalance arises because of our modern environment, which is predominantly obesogenic. This environment trends active life toward sedentary life. In particular, altering job forms cause this imbalance. This is accompanied by the increasing use of more automated transport and use of technologies at home. Another significant contribution to this imbalance is related to changes worldwide in food preparation and the types of food consumed, shifting from being high in fibre, vitamins and minerals to fatty food and foods high in sugars, which are often low in fibre (WHO, 2006).

WHO mentioned that urbanisation is regarded as a leading cause of obesity the migration of people from rural to urban areas seeking employment and a better standard of living, consequently, facing obesogenic factors among other factors. Iraq is not excluded from this change, especially the Kurdistan region; people are trying to cope with this modern life. In addition, people are stressed out coping with this situation, and this affects their bodies and their eating habits, thus, eating more than the body requires thereby increasing

their chances to gain weight (Dallman, 2010). In tension-filled times, the levels of the stress hormone “cortisol”, a hormone critical in managing fat storage and energy use in the human body, increases resulting in overeating which can become a habit if stress factors are not controlled or taken care of. Increased levels of this hormone escalates appetite and raises the insulin levels, thereby decreasing the blood sugar levels and increasing food cravings (Breeze, 2016; Sominsky and Spencer, 2014).

More so, many fast food and take away restaurants are introduced over the past 10 years, especially in shopping centres. They offer a variety of fast foods and people seek these places for leisure, marketing (shopping) and outdoor dining. A further contributing factor is that most of these venues are open until late, 1-2 am, encouraging customers to indulge in late food consumption. This situation is presently escalating in Kurdistan, therefore, conducting research on obesity and lifestyle is recommended, sharing result findings with the regional government and implementing strategies to manage this issue is paramount. Another cause of obesity is genetics and diet; some individuals are genetically disposed to become obese. However, the genotype involved can be expressed in certain adverse environmental conditions such as sedentary lifestyle and high fatty food intake, implying that genetics alone is not the cause of obesity. Diet is another obvious factor, according to Walley (2006) for one to become obese; children must also eat more calories than they need for growth and energy (Walley, 2006). Overall women are predisposed to gaining weight at certain periods in their life i.e. puberty, childbearing and menopause (Lehman, 2016). Alcohol abuse has also been linked to obesity, based on the fact that 1 gram of alcohol provides 7.1 kcal. In addition, alcohol is regarded as an appetite enhancer. Therefore, individuals consuming lots of alcohol will have increased energy intake, which

may promote a positive energy balance and ultimately weight gain. (Traversy and Chaput, 2015).

Socio-economic status (SES) has also been linked to the obesity epidemic, in the developed world; it is reported to be more common among low SES (NOO, 2012). The rationale for this is associated with nutritional deficiency among low SES, and access to low cost food, which is rich in fat and calories, but low in nutrition and vitamins. Another associated rationale is that low SES individuals have insufficient time and money to expend the amount of intake calories through physical activities such as swimming. Unlike individuals with low SES, those with high SES can obtain high cost foods or foods rich in nutrition and vitamins and can expend calories through leisure activities which they can afford to pay for (The World Bank, 2015; Wang and Beydoun, 2007) Although, the prevalence of obesity was reported higher among people with low SES in developed countries (Dinsa et al., 2012), the prevalence is reversed in developing countries where obesity is reported to be higher in individuals with high SES (Castro and Avina, 2002;). This is the case in Iraq, where the wealthier are more likely to be obese; the rationale for this is related to individuals' view of obesity as a sign of wealth, prosperity, and health (Mustafa 2014).

1.5.3 Inequalities and Obesity

Equality can be defined “as segments of population sharing broadly similar types and levels of resources with broadly similar styles of living and some shared perception of their collective condition” (Townsend et al, 1981; p 32). There is mounting evidence illustrating that the frequency of obesity is not distributed equally over the population, and the prevalence of obesity correlates with gender differences. Obesity rates tend to be higher among women than men, but this is not the case for all countries in the world, and

women are also predetermined to gain weight at certain times of their lives (The World Bank, 2010). There are many theories regarding this phenomenon. An article by Chou et al. (2003) documented that women earn lower wages than men and usually are more inclined to do house work rather than work outside of their homes, which leads to a more sedentary lifestyle. Case and Menendez (2009) investigated factors of obesity in South Africa. They reported that gender has a role in obesity—a greater obesity rate was reported among women. Their study showed that women who were nutritionally deprived as children, are significantly more likely to be obese as adults compared to men with similar experience. In addition, women of higher adult socioeconomic status were significantly more likely to be obese than men (Case and Menendez, 2009). Secondly, it was reported that obesity is growing faster among individuals of a lower socioeconomic status as was mentioned in previous sections (Case and Menendez, 2009; Healthway, 2012).

Age has also been correlated with obesity. The evidence shows that obesity is more prevalent in early life (childhood). A survey done in Australia by the WA Children and Adolescent's Physical Activity and Nutrition programme discovered that the prevalence of obesity among children increased from 9% to nearly 24% among boys and 10% to 30% among girls from 1985 to 2003 among those aged 7-15 years (World bank, 2015). It was also shown that middle aged people were more prone to being obese than other age groups due to a slower metabolic rate (WHO, 2006). Case and Menendez (2009) reported that childhood circumstances and adult SES could fully explain the difference in obesity rates between men and women (Case and Menendez, 2009).

Unfortunately, in Iraq and especially in the Kurdistan region, there are no national figures available for obesity rates among different ages and genders. The reason behind the

absence of statistics is related to shortage in experienced clinicians who can measure BMI for clients, which suggests a need for training. Currently, there are no official robust statistical evidence showing the prevalence and inequalities of obesity among women and men in this region.

1.5.4. Stigma and obesity

The concept of obesity appeared only a few decades ago and social scientists have argued over the definition of obesity (Puhl and Heuer, 2009). Most of them define obesity as a chronic disease, stigmatised in western countries (de Varies, 2007). However, Iraq is one of those cultures where obesity is viewed as a sign of health and wealth (Zangana, 2005), and so the issue of stigmatisation among the obese may be a social construct, relevant to only some countries.

Obese individuals are extremely stigmatised and confronted by various forms of bias, discrimination and prejudice because of their weight (Puhl and Heuer, 2010; Puhl and Brownell, 2001). The prevalence of weight discrimination is reported to have increased in developed countries such as the USA to about 66% compared to last decade (Puhl et al, 2009). Consequently, resulting in direct and indirect inequalities in healthcare, employment settings and education institutions (Puhl and Brownell, 2001). This was supported by a study conducted by Puhl and Brownell (2009) showing that obese individuals often face weight-based disparities in employment settings, ambivalence and stigma and often-unsatisfactory treatment in health care settings, and lower wages (Puhl et al., 2009).

From a social point of view, negative messages about obesity are continually passed through various social media outlets. This reflects an anti-fat prejudice that has been obvious and has its place in mass media such as most TV programmes, and stigma and

discrimination are the consequences of this bias (Puhl & Brownell, 2001). For instance, in most movies and drama, overweight characters are more often the object of jokes and criticism and are less likely to play leading roles, and are more often portrayed as eating out of control (Schwartz & Brownell, 2004). In other words, they are projected to be seen as weak. In this case, they are being destructed emotionally and psychologically. Beyond effects on psychological issues such as mood, self-esteem, and body image, bias can result in total discrimination (Puhl and Brownell, 2001). Altogether, stigma and discrimination may have an impact on health and psychological wellbeing of obese individuals (Schwartz and Brownell 2004). Moreover, according to Puhl and Brownell (2009), family and physicians are the common sources for discriminatory comments. Consequently, an obese person's frequent exposure to discrimination is likely to have more psychological-related problems. Regarding BMI and stigmatisation, some studies suggested that BMI negatively correlates with obesity stigmatisation (Lin and Reid, 2009; Yates et al., 2004), while others suggested that, they are unrelated (Latner et al., 2005; Perez-Lopez et al., 2001). However, in the Kurdistan region of Iraq, the social and cultural points of views about obesity are different compared to western countries like the United Kingdom (UK). Obesity in this region is viewed as a sign of beauty and health and most people, especially women prefer to have a larger shape. They consider those who have a lean shape as "having a worm in their intestines", traditionally. In other words, they define slim individuals as persons having gastrointestinal disease, seeing them as anaemic and weak. In contrast to Puhl and Brownell (2001) statement on overweight person being stigmatised and criticised in western communities, is reversed in Kurdish society where obese people are considered strong, vital and full of energy, whereas thin individuals are

mostly seen as weak with no energy (Mirkhan et al., 2012). Thus, obesity in this society increases and its complications hide behind the region's cultural norms.

Obesity is not stigmatised in Kurdish society but could begin to as the region becomes more westernised. Presently, obesity in this region is not visible; Kurdish traditional clothing is loosely cut and not showing much of an individual's figure. In Kurdish culture, an obese and tall woman is considered more attractive compared to a thin and short woman. This view is changing over time, but it has not yet reached the stage that obese women feel embarrassed or face social stigma. From the researcher's observation, the mass media depict tall and fat women adverts and entertainment as symbols of bravery and deserving of respect and are not giving lean women leading roles in TV shows. Likewise, female singers in Kurdistan are tall and mostly overweight and their songs are still played on TV channels and other social networks. This notion could affect new and younger generation. Therefore, conducting research in this region will create awareness to individuals on body weight and the possible effects of a high BMI.



PHOTO 1: Kurdish female singer, Kurdi Mard (2014)

1.5.5 Health effect of obesity

Obesity is described as a significant risk factor for diseases such as hypertension, diabetes mellitus, osteoarthritis, Cerebral Vascular Disease (CVI), and ischaemic heart disease (IHD) (Burkhauser and Cawley, 2008), thus the risk of premature death and serious chronic conditions is reported to be on the increase. The National Cancer Institute (NCI,

2012), has also suggested an association between obesity and increasing risk of certain cancer types. The associations were explained as follows: the release of certain hormones such as oestrogen due to release/production of excessive fat tissues can result in breast and endometrial cancer. In other words, most cancers associated with women such as breast cancer are oestrogen dependent and oestrogen is usually stored in adipose tissues. Another association is hyperinsulinemia which increases the chance for cancer development due to excess insulin hormone (Arcidiacono et al, 2012). Another possible mechanism is that fat cells usually have low level, or “sub-acute,” inflammation, which has been associated with increased cancer risk as well as altered immune responses, affecting the nuclear factor kappa beta system. We can state that white adipose tissue (WAT) adipocytes act as an endocrine organ and a source of low-grade inflammation (without infection), which augment the release of factors that cause vascular disease and dysfunction i.e. vasoconstriction. This results in an increased risk of developing cardiovascular disease and can also affect the course of other diseases such as diabetes (NCI, 2012). Overall, obesity is also considered a leading factor for serious social and psychological problems, which affects all ages and different socioeconomic classes (WHO, 2003). Both physical and social processes influence psychological impact of obesity, however, the physical aspect is not well understood. Nonetheless, some factors can be used to explain certain scenarios such as poor diet and weight gain may interfere with mood over changes in neurotransmitters (Schwartz and Brownell, 2004).

Moreover, research has examined the relationship between obesity and psychological problems. In this obesogenic society, Singh (2014) stated that mood disorders are often found in association with abnormal feeding behaviours, which leads to obesity; depression is an example (Kloiber et al., 2007). Impairment in central nervous system

(CNS) function has been linked to obesity that in turn impacts mental health (Duarte et al., 2010). A link between obesity and depression has been found in animal models of mood disorders (Akubuiro et al., 2013; Kumar et al., 2013), suggesting that a common signalling pathway may underlie these phenotypes in both humans and animals. Canetti et al. (2002) stated that the internal/external theory of obesity predicts that normal eaters alter their food intake to regulate their emotion, while obese people do not (Canetti et al., 2002).

Nowadays, with cultural obsession with slimness, the aversion to fatness is found among people especially in developed countries, and the attribution of blame to the obese may promote low self-esteem and poor self-image in those individual who do not conform to the stereotypically attractive thin image (Flegal, 2002). However, in Kurdistan region there is no available research on obesity and psychological effects but the cultural view of obesity in this society is different from European countries as discussed in section 1.5.4. Therefore, investigating obesity in this context may provide new insights

1.5.6 Strategies for tackling obesity

Many strategies have been discussed in the literature about preventing and managing obesity. These strategies are not without their challenges. The most effective strategy is to balance the body mechanism, in other words the intake of calories to energy expenditure should be equal (NIH, 2012). Understanding how the body can achieve this balance between intake and expenditure will help in finding out an effective strategy to reduce obesity. Most research proposed that healthy diet and increased physical exercise can place individuals in regulated zone of energy balance and make the most of the intrinsic biological mechanisms for managing energy balance than focusing more on promoting smarter eating and would reduce the need for intake restrictions (Singh, 2014).

At the end, in our current environment, maintaining a healthy body weight for most people requires using cognitive skills to help match energy intake with energy expenditure and to overcome biological tendencies to overeat and under exercise. Teaching these skills to people, particularly to children and young people, could equip them with better tools to be active participants in managing their own body weight (Benkeser et al, 2012). In Kurdistan region, there is insufficient knowledge about the importance of appropriate dieting programmes and the use of strategies to maintain proper health. People, especially women in this area, need comprehensive knowledge on Health and Nutrition Education through designed programmes and mass media such as TV programmes, and the press. For example, an interview was conducted by a local TV station (Rudaw) with Neurink (2014) who is working on preventing honour killing in the region. This approach used television as a tool to get a message across to a huge number of people in a simple way. Therefore, using mass media for marketing healthy programmes about social and health issues is important.

1.5.7 Obesity and women's health

Obesity has increased among women worldwide (WHO, 2015). The National Cancer Institute (2012) reported the prevalence of obesity among women aged 18-49 years old to be about 36% in the USA. Similarly, a study conducted in United Arab Emirates reported about 40% among the same age group of women (Kumari, 2001). In Iraq, especially in Kurdistan region, there are no official data on the rate of obesity among the population including women. However a study conducted by Al-Tawil et al. (2007), explored the prevalence of obesity among Iraqi people including Kurdistan and reported an obesity rate of 25% for non-pregnant women ages 18 and above. Recently, Mirkhan

et al. (2012) stated that 29% of women in the region are overweight or obese. However, this study is faulted for focussing only on employed women not housewives.

There is robust evidence showing that obesity has an impact on women's health and this effect can be seen at the age of puberty. It was observed that obese girls often experience puberty earlier than non-obese girls (Lash and Armstrong 2009; Wang et al. 2004). Increased adiposity may result in the higher oestrogen levels that are linked to early puberty (Jasik and Lustig, 2008). Obesity is also associated with disturbances in menstruation. An irregular menstrual cycle is more common among obese women than normal weight women, but the prevalence is still unclear (Practice Committee of the American Society for Reproductive Medicine, 2015). A review by Linne (2004) suggested that amenorrhea and infertility are common problems among obese women. High BMI is associated with an increase in serum and follicular fluid leptin concentrations and a decrease in serum adiponectin levels. Leptin acting through the receptors on the theca and granulosa cells inhibits ovarian steroid genesis (Metwally et al., 2007). Lower adiponectin levels are associated with increased circulating insulin, which can cause hyperandrogenaemia partly by inhibiting the hepatic SHBG (sex hormone binding globulin) production. In addition, associated effect of the insulin like growth factor 1 (IGF1), insulin enhances LH mediated steroid genesis in the theca cell system of the ovary and thus increases ovarian androgens. Hyperandrogenaemia results in granulosa cell apoptosis, while peripheral conversion of androgens to estrogen in adipose tissue inhibits gonadotropin secretion" (Metwally et al., 2007).

Lash et al. (2009) also found that obesity has further negative effects on contraception rates and uptake of hormonal contraceptives (Lash and Armstrong, 2009). Generally, in the Kurdistan region, the age of puberty among girls is between 10 and 13, but there are

no official figures on the age groups of puberty in this region and this requires further investigation. Moreover, another negative impact of obesity is the risk of polycystic ovarian syndrome (PCOS), which is higher in obese women than normal weight women. Although some research such as Linne (2004) stated that PCOS women have difficulty in dealing with energy balance and being constantly hungry which leads to increased weight gain and eating disorder, it is still unclear if obesity could lead to development of PCOS or opposite. In that case, women are advised to attend weight loss programmes to eliminate these issues (CEMACE/ACOG, 2010). Furthermore, other health problems among obese women are low back pain and osteoarthritis (Kulie et al., 2011).

Obesity is generally recognised as a complex situation and has serious social and psychological dimensions affecting all ages and socioeconomic groups including women during the reproductive age, causing various adverse pregnancy outcomes such as gestational diabetes, pregnancy induced hypertension and congenital abnormalities of new-borns (Thangaratinam et al., 2012; WHO, 2012). A number of papers have identified that obesity during pregnancy is associated with a number of complications such as risk for postpartum haemorrhage, infections including urinary tract infection (UTI), wound and perineum infection (Harrison et al., 2013; Bogaerts et al., 2012; Heslehurst et al., 2008; Clapp, 2002). Many research recommended that a successful intervention would include the provision of accurate information to obese women during and after the birth of the baby to avoid complications and help in maintaining good health.

1.6 Obesity and pregnancy

This section discusses the evidence around maternal obesity and adverse pregnancy outcomes, including obesity and maternal outcomes, obesity and labour outcomes and the

effect of obesity on the neonate. Then weight gain during pregnancy and the effect of body image on weight gain during pregnancy are also discussed.

Worldwide, the alarming increase in the prevalence of obesity means that health care providers (HCP) are confronted with an escalation of obesity among pregnant women (Guelinckx et al., 2008; Poston et al, 2011; Sirimi and Dimitrios, 2010; Soltani, 2009). The WHO reported that the incidence of obesity in pregnancy ranges from 1.8 to 25.3% (Guelinckx et al., 2008). The data from the NHS also (2012) revealed that the prevalence of obesity among women of reproductive age in the UK was 26.1%. Therefore, studies around obesity and its effect on mothers and new-borns are crucial, particularly in developing countries like Iraq where records on the prevalence of obesity among their population is lacking and government support is needed to find strategies to minimise this problem.

Maternal obesity is considered an obstetric risk factor, which has an effect on women's mortality and morbidity (Bowyer, 2008). Research throughout the world emphasises that maternal obesity is linked to a wide range of health risks for mothers and new-borns (Poston et al., 2011; Yogev and Catalano, 2009; Catalano and Ehrenberg, 2006; Sebire et al., 2001). However, the relationship between obesity and pregnancy outcomes is not universally recognised, which only serves to perpetuate the problem (Yogev and Catalano, 2009). Some research suggested that the most common adverse outcomes of maternal obesity are hypertension, diabetes mellitus, preeclampsia, and the need for Caesarean section. For the new-born, maternal obesity can lead to stillbirth, macrosomia and birth defects (Reece, 2008; Saskatchewan Preventive Institute, 2010; Yogev and Catalano, 2009).

Other possible maternal outcomes of maternal obesity during pregnancy that were suggested, but not conclusively proven in literature, are thromboembolic complications (including thrombosis), miscarriage, and respiratory complications. Regarding thrombosis, researchers have found that obese pregnant women are more likely to experience thromboembolic complications (Yogev and Catalano, 2009). This may be related to the decreasing rate of exercise or being sedentary, which is regarded as a predisposing factor for thromboembolic formation (Guelinckx et al., 2008). In the Kurdistan region, according to the researcher's experience, the prevalence of thrombosis is more obvious and higher but there is no research done on this topic and this needs further investigation.

The relationship between miscarriage and obesity has been widely examined (Rees et al., 2008). Some researchers concluded that obese women are more liable to miscarry their babies than normal weight women (Guelinckx et al., 2008). The mechanism behind this may be due to influences of obesity on the embryo and endometrium or both. Nevertheless, most of the results remain unclear and are far from conclusive, because the quality of studies have been questioned, particularly in terms of sample size (Rees et al., 2008). Consequently, it needs more attention and requires further research. In Kurdistan region, the majority of women have 1-2 spontaneous abortions during their reproduction life but the reason behind this has not been found yet and it needs to be studied in the future (WHO, 2007).

There are evidence suggesting that maternal obesity is linked to childhood obesity, but the causes are unclear (Pirkola et al., 2010; Rees et al., 2008). According to recent research, the condition of the uterus may programme the foetus for an increased risk of adult obesity (Fall, 2012), so tackling obesity before pregnancy is very important. For this

reason, early education and counselling before pregnancy and during adolescence regarding maternal obesity and its adverse outcomes is crucial (Durand et al., 2007). In the Kurdistan region, obesity during pregnancy has increased dramatically according to health care provider's standpoint; however, investigations and research about the incidence of obesity during pregnancy and its outcomes have not been investigated in this region and needs further exploration.

1.6.1 Maternal Obesity and Maternal Outcomes

As stated before, obesity during pregnancy is associated with adverse maternal outcomes and some of them are discussed in the following the sub-sections.

1.6.1.1 Pregnancy induced hypertension (PIH) and Pre-eclampsia

Maternal obesity is a well-established risk factor for the development of pregnancy induced hypertension (PIH); defined as a condition where a woman's blood pressure is 140/90 mm Hg or greater, after 20 weeks of pregnancy depending on measurement in two different occasions which are 4-6 hours apart (NHS, 2015). Currently, PIH is reported to affects 5-10% of pregnancies and remains a significant leading factor for poor pregnancy outcome in USA (Ehrenthal et al., 2011). The causes of PIH are not clearly understood, but research suggested that the condition is related to placental and maternal factors such as null parity, maternal age >35 or <20 and family history of PIH (ACOG, 2002 cited in Ehrenthal et al, 2011). Many studies have found an association between maternal obesity and PIH. Bhattachary et al. (2007) found a linear increase in PIH with increasing BMI, resulting in a 3.1 (95% CI: 2.0-4.3) for PIH in the morbidly obese women compared to normal weight women or recommended BMI. Callaway et al. (2006) found an increase in PIH with increasing BMI: obese women were three times more likely to have PIH. Furthermore, obesity was reported as a strong risk factor for PIH in a

population- based study of 96,801 pregnant women who delivered singleton babies conducted in the USA (Baeten et al., 2001). In addition, a study by Sebire et al. (2001) examined pregnancy outcome in 287,213 singleton pregnancies in the UK and found that PIH increased with increasing BMI which corresponded with the findings of Hauger et al. (2008) where elevated BMI is seen as a strong independent risk factor for PIH. Moreover, a large prospective cohort study of 16,102 pregnant women found a significant association of PIH with increasing BMI. However, Basu et al. (2010) reported that there was no difference regarding the incidence of hypertension within BMI groups and the author linked the rate of hypertension to other causal factors in their setting. However, an article by Yogev and Catalano (2009) stated that the prevalence of PIH is increased among high BMI women who have experiences of hypertension pre-pregnancy. If PIH is not treated, it might result in a condition called pre-eclampsia. Pre-eclampsia is defined as a condition in pregnancy characterised by hypertension with albuminuria (leakage of large amount of the protein albumin into the urine) and oedema of the face, hand and feet (NHS, 2015). Several studies have shown that pre-eclampsia is more common in obese women compared to normal weight women (Castro and Avina, 2002; Catalano and Ehrenberg, 2006; Dietl, 2005).

1.6.1.2 Gestational diabetes mellitus (GDM)

Maternal obesity has consistently been shown to be a risk factor for the development of Gestational diabetes. Gestational diabetes is a carbohydrate intolerance of varied severity that begins or is first recognised during pregnancy or defined as a condition where there is too much glucose in the blood, and this condition has adverse effects on women's health during pregnancy (NHS, 2014). The mechanism of gestational diabetes is the result of insufficient insulin secretion to compensate for increasing insulin resistance during

pregnancy. The pathophysiology of GDM involves abnormalities of insulin sensitive tissues. Beta cell sensing of glucose is also abnormal and is manifested as an inadequate insulin response for a given degree of glycaemia (Driul et al., 2008), thus affecting both the mothers` and babies` health. As Castro and Avina (2002) and Dietl (2005) stated, GDM is more common among obese women compared to normal weight pregnant women. Even though, DM has contributing factors such as age, ethnic origin and family history, obesity creates an independent risk factor as the frequency of gestational diabetes is 2-3 times higher in obese and overweight women than normal weight pregnant women. In an article which addressed issues concerning pregravid obesity and weight gain during pregnancy and its implication on pregnancy outcomes in USA, 10% of obese women were said to have been affected by gestational diabetes (Yogev and Catalano, 2009). Similarly, Morin and Reilly (2007) and Reece (2008) stated that pregnant women who are obese are more liable to have gestational diabetes during pregnancy.

Rode and his colleagues (2005), who obtained data from a cohort study on Danish women, identified that obese women were almost fifteen times more likely to develop gestational diabetes when compared to normal weight women (Rode et al., 2005). Furthermore, Ramos and Caughey (2005) conducted a retrospective study on the interrelationship between ethnicity and obesity and its effect on obstetric outcomes. They found that Asian and Latina women were more at risk for gestational diabetes than obese Caucasian women; reasons behind this are unclear (Ramos and Caughey, 2005). Their findings showed that obesity and ethnicity may have a role in developing gestational diabetes during pregnancy to greater degree than alone. Moreover, Leikin and his contemporaries stated that normal weight women with GDM can decrease their risk of adverse outcomes if they control their blood glycaemia through diet, insulin or anti-

diabetic drugs (Leikin 1987 cited in Sirimi and Dimitrios, 2010). Their findings showed that obesity and diabetes play independent role in foetal size. Unfortunately, in Kurdistan region, according to the author's experiences as a clinical instructor at Diabetic centre in Maternity teaching hospital, there appears to be an increase in mothers with gestational diabetes. In 2007, there were approximately 3-5 women per day with gestational diabetes who attended the centre for insulin injection. However, in 2012 according to health care provider's viewpoints, it reached 15-20 women per day indicating a significantly increase of 3-4 times. It appears that this observation may suggest that GDM is increasing in pregnancy in the region, and obesity may be a factor which is influencing the increase. By introducing an education programme for obese pregnant women, this may play a part in stemming the increase in GDM and perhaps reducing its prevalence.

1.6.1.3 Preterm labour

Preterm can be defined as delivery of a live baby before 37 weeks of gestation. An early preterm birth can be defined as the delivery of baby before 32 weeks of gestation. Preterm birth can occur as a result of preterm labour or elective delivery. It is regarded as a major cause of neonatal mortality and morbidity (Simmons et al., 2010). There is contradictory data in the literature regarding preterm birth and maternal obesity. Some scholars suggest that obese women are at increased risk of delivering preterm babies (Driul et al. 2008; Baeten et al., 2001). Other authors report decreased number of preterm births among obese women (Sebire et al., 2001), while others have found no association between incidences of preterm birth and BMI categories (Bianco et al., 1998). On other hands, Loftin et al. (2010) suggested that some preterm births results from other conditions like PIH, Caesarean section (CS) and multiple gestations.

A systematic review conducted by Lambert and Germain, (2010), including 84 studies, aimed to find out the relationship between obese mothers and preterm birth in singleton pregnancies in developing and developed countries. The review found that there were no significant differences between obese and overweight compared to normal weight women regarding their risk of preterm birth. However, among obese and overweight women the risk of induced preterm birth was increased. The higher the BMI, the higher the risk of induced preterm birth before 37 weeks. A retrospective cohort study illustrated that there is a relationship between preterm birth, BMI and parity; obese nulliparous women were at increased risk of preterm deliveries compared to normal weight women, whereas, among obese multiparous women the risk was highest among those with normal weight (Cnattingius et al., 2015).

1.6.2 Maternal obesity and labour outcomes

There are further probable consequences of maternal obesity on pregnant women during labour which include: prolonged labour, induction of labour, and Caesarean section (Morin and Reilly, 2007). Arrowsmith et al. (2011) suggest that obese women are more prone to have a prolonged labour than normal weight women. They base their findings on a retrospective cohort study that investigated the effect of maternal obesity on mode of delivery following induction of labour (IOL) for prolonged pregnancy and subsequent intrapartum and neonatal complications in UK. The study included 29,224 women with singleton pregnancies between 2004 and 2008 of whom 3,076 had a prolonged pregnancy (defined as ≥ 290 days or after 41 weeks of gestation) and received IOL. They concluded that higher maternal body mass index at booking was associated with an increased risk of prolonged pregnancy and increased rate of IOL. Despite this, more than 60% of obese primiparous and 90% of multiparous women with prolonged pregnancies who were

induced achieved vaginal delivery and labour complications in the obese women with prolonged pregnancies, were largely comparable to those of normal weight women with prolonged pregnancies. Vahratian et al. (2005) have stated that this phenomenon may be related to the added soft-tissue deposits in the pelvis of obese women, which coupled with a larger foetus, might necessitate more time and stronger contraction to progress through labour. In a clinical setting, these women are more liable to be induced than normal women (Doherty and Norwitz, 2008).

1.6.3. Maternal obesity and neonatal outcomes

There is robust evidence suggesting that maternal obesity is linked to adverse foetal and neonatal outcomes such as birth defects (i.e. neonatal neural tube defect (NTDs) and spina bifida), still birth and macrosomia (birth weight of more than 4000g).

Guelinckx et al. (2008) stated that the most frequent adverse labour outcome among obese pregnant women was an increased chance of having a Caesarean section (CS) (Guelinckx et al., 2008). Castro and Avina (2002) assert that performance of CS is linked to several explanations including: failure in induction of labour, macrosomia and CPD (condition when the baby's head is bigger than mother's pelvic size). A study by Dietl (2005) supported and confirmed this relationship. A study by Khashan and Kenny (2009) examined the effect of BMI in early pregnancy on adverse pregnancy outcomes. The study was a population based register cohort study using data from North Western perinatal survey in UK, including 99,043 live born or still birth babies during 2004-2005. The study concluded that obese women were at higher risk for CS than normal weight women. In fact, according to HCPs' perspective, the rate of CS has increased noticeably in Kurdistan, and there is no study at present in this region regarding the causes and

predisposing factors behind this increase. For that reason, it is important to explore this condition and find out the cause for the high numbers of CS in this particular region. Whilst this study does not specifically focus on CS rates generally, as there is a link with obesity, it will be evaluated as a maternal outcome among obese women and normal weight women and between obese women who received and did not receive the antenatal education programme.

1.6.3.1 Birth defect

The relationship between obesity and birth defects has been investigated many times. Some research states that birth defects, i.e. NTDs, are associated with folic acid deficiencies (Brite et al., 2014). Women with high BMI are at increased risk of delivering a baby with birth defect. A meta-analysis conducted by Rasmussen et al. (2008) including 12 observational cohort studies reported that birth defects can be seen more among obese women than normal weight women. The association between NTDs with obesity remains unclear and further studies are needed to investigate that (Rees et al., 2008). However, the rationale for occurring birth defect among obese women is related to decreasing serum folate (CMACE/ RCOG, 2010; Rader and Schneeman, 2006). According to the joint guideline between CMACE and RCOG on management of obese pregnant women, obese women should receive higher doses of folate supplementation in order to minimise the risk of birth defects.

Stothard et al. (2009) conducted a systematic review and found that there is an association between obesity and birth defects and obese women were more likely to have a baby with some kinds of congenital abnormality such as NTD or spinal bifida. Whereas Dietl (2005) found that there is no relationship between maternal obesity and birth defects within a

sample size of more than 10,000 participants. In the Kurdistan region of Iraq, numbers of neonate defect and congenital abnormality have increased. However, the government has linked these issues with the aftermath of the chemical bombing which occurred in 1988 when Saddam Hussein attacked the North of this region (Hama cited in Barbati, 2013). However, this hypothesis has never been substantiated; therefore it needs further investigation, as there may be other factors influencing the increase, such as maternal obesity.

1.6.3.2 Birth weight

According to the literature, the prevalence of macrosomia has been seen more frequently among obese women. A study by Ehrenberg et al. (2004), who reviewed 12,950 pregnancies, found that obesity is independently associated with the prevalence of macrosomia. Macrosomia can be defined as a condition where the birth weight is 4000g or above. The reason for that is transference of glucose and insulin from the placenta to the foetus. Insulin is a growth factor which can lead to macrosomia (Lambert and Germain, 2010). Similar results were found in a cohort study by Sheiner et al. (2004), who reviewed 126,080 deliveries and concluded that obese women are at more at risk of having a baby with macrosomia than normal weight women. There is a suggestion of a link between GDM and Macrosomia. Levy et al. (2010) conducted a population-based study to compare the birth outcomes of women with and without a family history of DM. The study concluded that family history of diabetes mellitus has a significant independent association with the risk for macrosomia.

1.6.3.3 Stillbirth and neonatal health

A study by Salihu et al. (2007) reported that obese women were about 40% more likely to have stillbirths than non-obese women. According to the outcome of a systematic review by Chu et al. (2007), obese women were at risk of stillbirth. Similar findings were reported by a Danish study on 24,505 singleton pregnancies (Chu et al, 2007; Kristensen et al, 2005). The results of this study will add to the body of knowledge around the effects of obesity on foetal and neonatal outcomes in developing countries like Iraq by comparing birth weight among obese and normal weight women. Regarding Apgar score, which can be defined as an objective of babies' condition after birth, for more information see (appendix1.3). The score is determined by scoring heart rate, respiratory effort, skin colour, responses for surrounding stimuli and muscle tone. Each of these objectives will mark 0, 1 and 2. For example, an infant with Apgar score of 10 means best condition whereas an infant with 0-3 score means poor condition. Usually, Apgar score will be assessed within the 1st minute after birth and repeated within the 5th minute (Galtier-Dereure, 2000). It has been stated that low Apgar score can be seen more among obese pregnant women. Previous studies (Scott-Pillai et al, 2013; Ovesen, Rasmussen, & Kesmodel, 2011; Cedergren, 2006) reported that babies born to obese women were at more risk of low Apgar score than normal weight women. Similar findings can be seen in several studies such as that of Chen et al. (2010) and Sebire et al. (2001),. Both studies reported that infants of obese mothers were more likely to suffer traumatic delivery, and in need of neonatal intensive care. In delivery rooms in Kurdistan region, the health care providers who conduct the delivery of babies assess the Apgar score. This is done immediately after the birth of the babies, to ascertain their health. The results were documented for a follow up when necessary. The observation of the researcher, who

served as a clinical instructor at the delivery room, is that the babies who had low Apgar score were transferred to another unit for treatment while those with good Apgar scores were cleared.

1.6.4 Body Mass index and gestational weight gain

An increase in weight is observed in women during pregnancy, because of the weight of the foetus, the placenta and an expanding blood volume (Linne, 2004). Using BMI during pregnancy has its limitation as it is well-known that during pregnancy there is naturally a need for maternal weight gain, which reflects the placenta (0.5kg), amniotic fluid (0.5-1kg) and the foetus. There is no conclusion on healthy and unhealthy BMI during pregnancy (Catalano et al., 2012; NICE, 2010). Recommended weight gain during pregnancy has been suggested and has become a current arguable topic (Claesson et al., 2011). Currently, in the United Kingdom, there is no guideline on recommended weight gain during pregnancy as a consequence. NICE (2010) has suggested the need for further research. However, in the USA, The American Institute of Medicine (IOM) recommend weight gain parameters based on a woman's pre-pregnancy BMI. According to their guideline, women with a high pre-pregnancy BMI should gain less weight during pregnancy than normal weight women (IOM, 1990).

Table-1.3 Recommended weight gain during pregnancy according to IOM (IOM, 2009)

Pre-Pregnancy BMI Category		Recommended range of total weight gain
Underweight	<18.5	12.5-18 kg
Normal weight	18.5-24.9	11.5-16 kg
Overweight	25.0-29.9	7-11.5 kg
Obese	≥ 30	5-9kg

According to IOM, pregnant women with a BMI ≥ 30 should gain between 5-9 kg during their pregnancy. Nonetheless, this recommendation is used in USA but in UK there is limited evidence for supporting this and no guidelines in situ (Claesson et al., 2011)., However, a large number of studies use this recommendation as a guideline. According to the large observational study conducted in United States of America (USA), approximately 30-40% of pregnant women gain weight within the recommended range, 20% gain less and 40-50% gains more than the recommended range (Siega-Riz et al., 2009).

In terms of consequences for excessive weight gain and pregnancy outcomes, a study by DE Vader et al. (2007) assessed the relationship between gestational weight gain (GWG) and pregnancy outcomes. DeVader and colleagues found that those pregnant women who gained less weight than recommended were less prone to experience adverse pregnancy outcomes such as failed induction, Caesarean birth, pre-eclampsia and macrosomia. However, those women who gained more than the recommended weight were at greater risk of failed induction, Caesarean birth, pre-eclampsia and macrosomia. Similarly, Nohr et al. (2007) stated that pregnant women who gained weight more than the recommended range were less likely to lose weight in the postpartum period and could retain such weight for next pregnancy, and have a higher risk of increased weight for the rest of their life. However, research has shown that gaining weight beyond the recommended range causes poor pregnancy outcomes (CDC, 2016; Rasmussen et al., 2008), and there is also evidence that gaining less weight during pregnancy has adverse pregnancy outcomes. A systematic review conducted by Siega-Riz et al. (2009) concluded that inadequate weight gain resulted in preterm birth and low weight infant for gestational age, but their study is limited by a low sample size of less than 100 participants. According to the researcher's

point of views as a lecturer in Kurdistan, there is no recommended guideline for weight gain during pregnancy. Women are usually weighed at each antenatal visit and when nurses recognize a weight gain of more than 90kg and less than 45 kg, they assign the women as being at risk and they are referred to antenatal physician for further investigations without considering women`s height and calculating their BMI.

1.6.5 Weight gain for obese pregnant women

The important issue during pregnancy for obese pregnant women is obesity in early pregnancy rather than gestational weight gain during pregnancy (Daemers et al., 2013; Catalano et al., 2012). There are studies whose findings showed that obese women gained less weight than normal weight women as a physiological phenomenon (Yaktine et al., 2009). A prospective study of a cohort of 245,526 Swedish women confirmed that the gestational weight gain among obese women was lower (11.1 kg) than in normal weight women (Cedergren, 2006). In the same vein, in a Danish National Birth Cohort, which comprised 62,167 women, 36 percent of the obese women exhibited low rates of gain (Nohr et al., 2007). Conversely, Siega-Riz and Laraia (2006) found that obese pregnant women were more likely to gain more weight during pregnancy compared to normal weight women (Siega-Riz and Laraia, 2006).

There is less robust evidence regarding a normal range of weight gain among obese pregnant women, because of confounding variables such as maternal age, parity and prepregnancy body size (Chu et al., 2009; Shaw et al., 2001). As briefly discussed before, there are some recommended guidelines regarding weight management during pregnancy, in which different types of strategies are employed (IOM, 1990; CMACE/RCOG, 2010; NICE, 2010). However, recommendations for gaining weight during pregnancy have changed over time. In the 1950s, the recommended weight gain

ranged between 7-8 kg in order to decrease the chance for macrosomia and birth complications (Dieckman 1952 cited in Linne, 2004). Afterwards, Caesarean section was commonly used in clinical settings so that women were allowed to gain more weight. In the 1990`s the Institute of Medicine recommended weight gain according to pre pregnancy body size (see table, 1.3) in this chapter.

1.6.6 Effect of body image on pregnancy weight gain

Body image can be defined as a person`s perception and attitude towards his or her own body (Grogan, 2010). As was stated by Schwartz and Brownell (2004), obesity is related to body image distress, and at the same time, it can motivate people to start losing weight. Nemiary et al., (2012) note that obesity is more likely to be linked to dissatisfaction, which causes stress and depression and is regarded as a connection to chronic diseases. Studies around the insight of body image showed that obese people like individuals with anorexia nervosas tend to overestimate their body size (Collins, 1987). It was suggested that there is a relationship between body image and weight-related concerns in non-pregnant women (Schwartz and Brownell, 2004). Nevertheless, perceptions among ethnicities are different according to a study conducted in the USA (Molloy & Herzberge, 1998). This study suggested that African American women prefer a larger body size compared to Caucasian women and related the difference in perception to cultural norms. Similarly, in Kurdish culture, there is a preference for weight gain during pregnancy and the women are satisfied with this appearance, because they relate support and strength with large size. Mehta et al. (2011) conclude that the association between body image and weight gain has not been clearly reported on a global scale and needs further investigation. Mehta and his colleagues stated that women`s perception of their body during pregnancy is associated with gestational weight gain but the relationship is very complicated. For this

reason, further study is required to identify the factors which influence pregnant women to gain weight above IOM guidelines. This will improve the ability for detecting high risk pregnant women and poor pregnancy outcomes. It is vital for Kurdish pregnant women to be aware of the effect of weight gain. The next section explores health education and health outcomes to provide the reader with available literature and evidence around effects of health education (intervention programme) on health outcomes (pregnancy outcome). In addition, it explores theories of behavioural change and how they can be applied to contribute to a healthy lifestyle including dietary and physical activity behaviours during pregnancy. Finally educational theories and strategies including teaching strategies, benefits of antenatal classes versus one interviews, motivational interview are be discussed.

1.7 Health education and health outcomes

Health education can be defined as the process of teaching and directing individuals who seek to improve, maintain, and safeguard the health care of the community through empowering the individual to make informed choices about their health lifestyle (Glanz et al., 2008; Bowden and Manning, 2006). Crafter (1997) adds that education is not just teaching people about healthy lifestyle, it also includes helping them to learn how to improve and get rid of unhealthy behaviour. Health outcomes can be defined as a process that evaluates the health status or changes in the distribution of health determinants after a medical intervention (WHO, 2014). Moreover, most debate on the effects of health education expect a positive outcomes (WHO, 2014; Feinstein et al., 2006). Feinstein et al. (2006) suggest a strong link between health education and health outcomes. An illustrative example is the study conducted by Dyson et al. (2005) on the education and counselling about advantages of breast-feeding and its effect on women's behaviour

towards breast feeding; the conclusion of this study associated health education during pregnancy with early initiation of breast-feeding and a longer duration of breast-feeding. A systematic review by Dodd et al. (2008) highlighted that enhancement in health outcomes generally occurs when a multi-faceted intervention approach is used in comparison to a single intervention approach. As Amorim et al. (2013) suggested, diet and exercise after childbirth, will help women reduce weight gain. Exercise alone is not good enough. Likewise, a review by Gibson et al. (2008) reported that limited asthma education (verbal information only) had no significant effect on the patient's behavioural change, while education with written information and audio-visual reinforcement may alter the patient's behaviour. Consequently, the key principle of the health education programme used in this research was a multifaceted intervention approach including dietary advice and exercise in addition to an educational package, which were provided in hand-outs and pamphlets in order to make the educational programme more effective.

There are some standardised guidelines for health care providers to work with this particular group of pregnant women, such as The National Institute for Health and Clinical Excellence (NICE, 2010). NICE recommend that obese pregnant women should be advised by health care providers regarding appropriate healthy diet and exercise and discourage inappropriate dieting when pregnant and obese. In the NICE guidelines, obese women are regarded as high risk, thus requires additional screening and intervention. Moreover, in their guidelines they suggest that moderate intensity exercise is not harmful during pregnancy, so pregnant women can do up to 30 minutes per day; an example of moderate intensity physical activities is brisk walking and swimming (NICE, 2010). A joint guideline between the Royal College of Obstetricians and Gynaecologists (RCOG)

and the Centre for Maternal and Child health Enquiries (CMACE), published in 2010, provided a guideline of interventions prior to conception, during and after pregnancy. While the majority of the recommendations pertain to women with a BMI ≥ 30 , some recommendations are specific to women with BMIs over 35. A significant limitation of this guideline is that it fails to take into account that most women do not plan their pregnancy and therefore cannot make use of pregnancy education. Furthermore, it recommended that obstetricians are included in caring for obese pregnant women. Obese pregnant women are advised to deliver their babies in a consultant delivery suite because they are at risk of developing labour complications (CEMACH, 2010). Finally, the Institute of Medicine in 1990 (IOM, 2009) provided recommendations regarding weight management during pregnancy for obese pregnant women and these recommendations were revised in 2009. Recommendations included guidance on total range of weight gain during pregnancy based on women's BMI categories. For example for obese women (BMI $\geq 30\text{kg/m}^2$), it was recommended that a normal weight gain would be between 5-9kg (IOM, 2009).

In the Kurdistan region, health education is a new concept and it requires time to integrate health education into schools, communities and public health care centres. Unpublished studies on various topics of health education in this region exist, however most of them were not conducted using an academic approach or a research based concept. They were not conducted by educated individuals with knowledge and background about behavioural change nor were educational theories and the effectiveness of intervention adequately evaluated.

There are health implications in pregnancy for women themselves who are obese and also for their babies. Antenatal educational programmes have proven to be useful in western countries, and may have some potential in Kurdistan.

1.8 Research Problem, Aim, Questions

1.8.1 Statement of the problem

In the context of an increase in the pregnant obese population in the Kurdistan region of Iraq, there is a need to investigate strategies to minimise adverse pregnancy outcome among obese pregnant women through a designed educational programme.

1.8.2 Research aims

This feasibility study aims to explore the appropriateness of an educational programme for obese women and its influence on pregnancy outcomes with a view to undertaking a larger randomised controlled trial.

The main research objectives are:

- To assess the acceptability of an antenatal educational programme for obese women (the intervention)
- To assess the level of compliance with the intervention
- To identify any areas for improvement to refine the intervention accordingly
- To assess the influence of an educational programme on the pregnancy outcomes of obese women attending primary health centres in a large city in the Kurdistan region of Iraq, by comparing pregnancy outcomes between obese women (BMI ≥ 30) attending an educational programme (intervention group) with those who are obese and did not attend an educational programme (control) and those of normal weight (BMI 18.5-24.99) who did not attend an educational programme (baseline and control group)

- To explore obese women's experiences of an educational programme and their perceptions of benefit to pregnancy outcomes

1.8.3 Anticipated outcomes:

A/ Primary outcomes to be measured for all groups include:

1. Maternal outcomes during pregnancy including pregnancy induced hypertension, gestational diabetes mellitus, gestational weight gain and preterm birth
2. Labour outcomes including mode of delivery, prolonged labour, and prevalence of episiotomy and induction of labour
3. Neonatal outcomes including Apgar score, birth weight, still birth, macrosomia and birth defects.

B/ Secondary outcomes for intervention group only:

1. To provide an understanding of the obese woman's experience of attending the education programme during pregnancy
2. To identify the perceived benefits and limitations of the educational programme and its value in order to inform its on-going development

1.8.4 Research questions

This study includes the following research questions:

1. What are the pregnancy outcomes for normal weight women (baseline group)?
2. What are the pregnancy outcomes for obese women (control group)?
3. What are the pregnancy outcomes for obese women attending educational programmes (intervention group)
4. Do normal weight women (baseline group) have better pregnancy outcomes when compared to groups consisting of obese women (intervention and control group)?

5. Do intervention group (obese pregnant women with educational programme) have better pregnancy outcomes than control group (obese pregnant women without educational programme)?

1.8.5 Research hypotheses

The project tests the hypothesis that obese women who participate in a health education program (intervention group) have improved pregnancy outcomes compared to those obese women who do not participate in the program (control group).

1.9 A brief description of the presentation of the thesis

The thesis is divided into six chapters. Each chapter is organised into further subchapters. Each chapter starts with a short overview of its contents and finishes with a summary and conclusions. This structure is envisaged to guide the readers to get a brief synopsis for each individual chapter. The contents of each chapter are as follows:

Chapter two (Literature Review):

Chapter two presents the literature review strategies, the key words for the systematic literature search and the outcomes of the search. The literature comprises the current literature around antenatal education, maternal obesity and their effect on pregnancy outcomes.

Chapter three (Methodology):

Chapter three describes the research methodology, the rational for choosing a mixed method approach, including its advantages and limitations. It further describes the methods for both quantitative and qualitative data collection, and the data collection process. It closes with a discussion of the data analysis methods and process, ethical considerations and the process of developing the educational intervention.

Chapter four (Results):

Chapter four presents the results of data analysis in two sections based on the two phases of the research. The first section presents the quantitative data, including tables and figures. The second one presents the qualitative data, drawing on quotations from conversations between participants and the researcher.

Chapter five (Discussion):

Chapter five offers a discussion of the main findings based on the data analyses in chapter four. The chapter presents the main discussion around positive and negative pregnancy outcomes, around educational strategies, barriers and challenges in Kurdistan region, socio- cultural factors, lifestyle changes in patriarchal society, and cultural views on obesity.

Chapter six (Conclusion, Recommendation, Contribution to Knowledge, and Limitations):

Chapter six commences with a detailed conclusion and answers the research questions. Then, contributions to knowledge are discussed, followed by a discussion of the study's limitations. The chapter closes with recommendations for practice and future research.

1.10 Summary of chapter one

This chapter provides a summary of the general research idea about obesity, incidence of obesity during pregnancy to enhance understanding of the problem and its significance. This chapter introduced the research aim, justified the necessity for the study and outlined the researcher's personal motivation driving the studies. It proceeded to present an overview of the geography of Kurdistan region in Iraq, Kurds' history, their languages, religion, culture and family structure, marriage patterns, the role of women in Kurdish society and political changes. Next, the health sector including health developments, health indicator and maternal services in Kurdistan were illustrated. This is followed by

a presentation of important research themes, which are obesity, obesity and pregnancy, health implication on the mother and the new-born, health education programme for pregnant women and women`s role within society specifically during pregnancy. The introduction discussed the overall research aims, the anticipated outcomes, and hypothesis of the study.

The next chapter presents a critical view of the relevant literature to provide the reader with present literature around the impact of educational programme on pregnancy outcomes.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the search strategy employed to review the literature of relevance to this research study. The main purpose of this chapter is: to provide overviews of the literature relating to research questions; commences with description of how the chapter provides an overview of the literature relating to the research questions, and with a description of how the literature was accessed and utilised for the purpose of this chapter. The literature review is vital to all steps of the research process. A literature review consists of a careful systematic and critical review of the most important scholarly activity on a particular topic (Karen and Colin, 2010). The main goal of the literature review is to develop a strong knowledge base in order to carry out research and other scholarly educational and clinical practice activities. Secondly, to explore literature around educational intervention, maternal obesity and pregnancy outcomes. Finally, a summary of the chapter is then presented.

2.2 Search strategy

2.2.1 Introduction

Prior to carrying out a primary research, it is imperative to review the existing literature on the topic/subject in question (Bryman, 2015; Jones, 2007). Searching literature is the first step of any literature review because it helps the reviewer access informative resources upon which to base that review. This step was challenging because antenatal education and obesity is not a new area of concern. The studies related to the issue are found on various databases, rather than in one specific location. Appropriate literature searching can maximise the number of eligible primary sources (Whittemore and Knafl,

2005). The aim of a systematic review is to identify the gaps in research knowledge (Hewitt-Taylor, 2002), to combine, and to examine the results of previous research (Bryman, 2015). Therefore, in this review, the systematic approach was used to understand the previous knowledge concerning antenatal education, maternal obesity, and pregnancy outcomes.

2.2.2 Process of literature search, and inclusion and exclusion criteria

The first stage of a literature search process includes defining the purpose of the systematic review, formulating a research question, searching the relevant literature, evaluating, and analysing data, as well as presenting the results (Holopainen et al., 2008). In otherworld, the main steps for searching the literature are; the identification and formulation of the problem. This step involves formulating a question, as the researcher was seeking an understanding of the antenatal educational programme for obese pregnant women, as well as, its effect on pregnancy outcomes. The second step of this review was the literature search stage.

The initial searches were conducted in early 2012 and have been periodically updated throughout the course of the study via various databases for Nursing and midwifery. These databases included: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, MEDLINE, the Applied Social Sciences Index and Abstract (ASSIA), the Cochrane Database for Systematic Reviews (CDSR), Google Scholar and British Nursing Index (BNI). The databases specialized in research articles, original research and full text of highly systematic reviews for example CINAHL (Griffiths and Riddington, 2001). A wide range of databases were explored in the course of this research because the subject of obesity and antenatal education is covered in many medical fields including physiology, medicine, nursing, public health and health promotion. A more

focused search for articles of relevance was carried out by browsing through journals, documents, reports from sources including NICE, Science Direct, WHO, CEMACH, NHS library, and organisations such as International Journal of Obesity, as well as reviewing reference lists of literature reviews, using keywords described in table .2.1

Table (2.1) Databases used in the Literature Review

Keyword (s)	CINAHL	Scopus	MEDLINE	ASSIA	CDSR	BNI	Google scholar
Obesity	66,065	190,695	237,120	9320	85	39,802	1,260,000
Overweight	13,023	42,980	171,123	2,109	59	18,241	501000
Maternal obesity	715	7,862	8960	163	9	4,816	148000
Maternal overweight	174	2,591	6800	95	6	2,134	18100

To narrowing the focus of review, the combination of key terms was conducted as was shown in the table (2.2)

Table (2.2) search terms

Maternal obesity	OR/ AND	pregnancy outcome*
		Health educat*
		Healthy lifestyle
		Antenatal educat* / classes
		Childbirth educat*
		Parent educat*
		Teaching strategy*
Childbirth education	OR	
Parent education		
Antenatal classes	OR/AND	pregnancy outcome*
		Behavioural chang*
		Teaching style*
		Teaching strateg*
		Group discussion

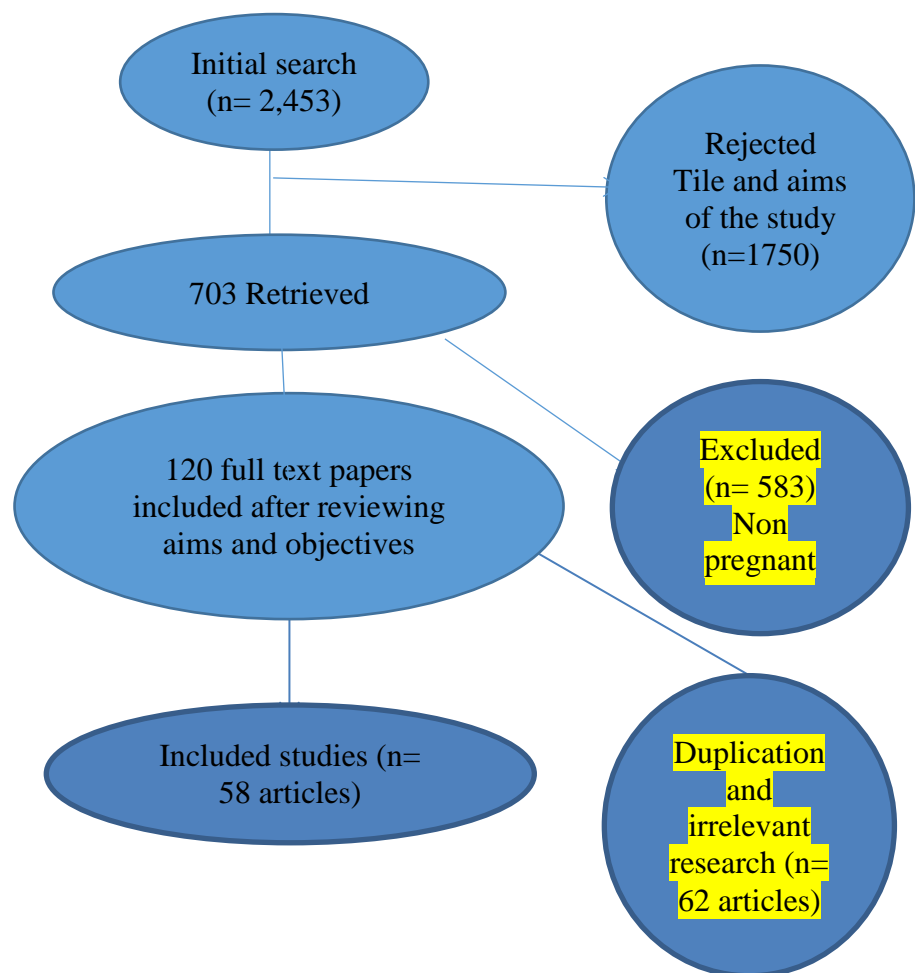
With above keywords, the literature on antenatal educational programme for obese pregnant women published between 2004- 2011, was accessed through to September - December 2011, and again in 2015 to assess the newer publications and update the literature review.

The search produced 120 full text articles relevant to antenatal education programme for obese pregnant women. However, to narrow the scope of the review, inclusion and exclusion criteria, as stated in the following paragraph, were used. This resulted in 58 papers which were used for reviews (Figure 2.1).

Inclusion and exclusion criteria for literature review

The inclusion criteria for this review were peer review and publication in English and Kurdish language articles (because the researcher is fluent in these two languages and she writes her study in these languages). Most of Arabic, Turkish and Persian research have versions of the same study in the English language. The publications spanned topics on antenatal education, childbirth classes, and lifestyle interventions on obese and overweight pregnant women whose outcome measures included quantitative maternal and foetal health outcomes. In addition, human studies research articles addressing maternal obesity and pregnancy outcomes, health promotion, teaching style, educational theories and educational programme were included. Articles published no more than 15 years ago were used because it is especially important in the health sciences to look at up-to-date articles to capture recent developments. Exclusion criteria were; Obesity articles not related to the social sciences such as pure chemistry. Articles with low methodological qualities were selected by applying the criteria used by Coughlan and Cronin (2007) for critiquing literature including methodology, sample size, population and outcomes (Appendices 2.1). Data were extracted and checked by the researcher through using a paper-based tool which included aims and objectives of the study, method of the study, strength and weakness of the study and relevant or not (Appendices, 2.2). The literature was revised after the systematic reviews of literature to include key publications that have been published more recently prior to submission of thesis

Figure-2.1 literature search method



2.2.3 Outcomes of literature reviews

Research articles of any study design that assessed the association between maternal BMI and pregnancy outcomes and educational effectiveness on the outcomes was accessed. Studies with nulliparous and multiparous pregnant women conducted in hospital, clinic,

health care centres were included. More so, articles were included if the participant pregnant women with measure or estimate of pre-pregnancy or early pregnancy weight reported according to BMI. The outcomes were gestational weight gain during pregnancy (GWG), gestational diabetes Mellitus (GDM), Pregnancy Induced Hypertension (PIH), Gestational age at onset of Labour (GA), Mode of Delivery including Caesarean Section (CS), Induction of Labour (IOL), Episiotomy, duration of Labour, Birth weight (BW), Apgar Score, admitting new-born to ICU, Still Birth and Birth Defects.

The characteristics of the included studies are presented in the appendix (2.3) of the included studies which investigated pregnancy outcomes from USA, Canada, UK, Germany, Norway, Finland, Taiwan, Brazil, and Colombia. Studies which investigated weight gain during pregnancy according to IOM were; Bisson et al., 2014; Moses et al., 2014; Murtezani et al., 2014; Cordero et al., 2014, Di Carlo et al., 2014; Hui et al., 2014; Althuizen et al., 2013, Harrison et al., 2013; Petrella et al., 2013; Ruiz et al., 2013; Wilkinson, Poad & Stapleton, 2013; Nascimento et al., 2012; Hui et al., 2012; Jackson 2011; Vinter et al 2011; Phelan et al., 2011; Quinlivan Lam and Fisher et al., 2011; Angel et al., 2011, Barakat et al., 2011, Guelinckx et al., 2010,; Asbee et al., 2009; Thornton et al., 2009; Wolff et al., 2008; Clapp 2002, and Polley et al., 2002.

While, those included studies that investigated Birth weight as an outcomes of their studies were; Cordero et al., 2014; Dodd et al., 2014; Di Carlo et al., 2014; Murtezani et al., 2014; Hui et al., 2014; Ruiz et al., 2013; Althuizen et al., 2013; Harrison et al., 2013; Hui et al., 2012; Ferrara 2011; Barakat et al., 2011; Phelan et al., 2011; Guelinckx et al., 2010; and Polley et al., 2002.

Studies that investigate Macrosomia include Cordero et al., 2014; Moses et al., 2014; Hui et al., 2014; Murtezani et al., 2014; Althuisen et al., 2013, Poston et al., 2014; Vinter et al., 2011; and Polley et al., 2002.

Althuisen et al., 2013, Petrella et al., 2013; Phelan et al., 2011; Quinlivan Lam and Fisher et al., 2011; Thornton et al., 2009; and Polley et al., 2002 investigate preterm birth. Regarding gestational diabetes, Cordero et al., 2014; Dodd et al., 2014; Hui et al., 2014; Moses et al., 2014; Althuisen et al., 2013, Harrison et al., 2013; Petrella et al., 2013; Poston et al., 2014; Ruiz et al., 2013; Hui et al., 2012; Vinter et al., 2011; and Thornton et al., 2009 reported its impact in their studies. Caesarean delivery was investigated in the following studies; Hui et al., 2014; Ruiz et al., 2013; Vinter et al., 2011; Barakat et al., 2011; Phelan et al., 2011; and Asbee et al., 2009.

Bisson et al., 2014; Dodd et al., 2014; Petrella et al., 2013; Ruiz et al., 2013; Nascimento et al., 2012; Phelan et al., 2011; Guelinckx et al., 2010; Asbee et al., 2009; Thornton et al., 2009; Wolff et al., 2008; and Polley et al., 2002 investigated PIH and pre-eclampsia. Bisson et al., 2014; Cordero et al., 2014; and Ruiz et al., 2013 investigate gestational age at onset of delivery, whereas, Cordero et al., 2014; Ruiz et al., 2013; and Moses 2009 investigated mode of delivery. Guelinckx et al., 2010 and Moses, 2009 studied induction of labour.

Murtezani et al., 2014 and Ruiz et al., 2013 investigated new-born Apgar score and the only researcher who investigate admission of new-born to NICU was Vinter et al., 2011. In final steps, the structure of the literature analysis relevant to maternal obesity and educational programme in this study was concluded from all selected evidence, which was then discussed in two sections: effect of antenatal intervention on maternal outcomes and effect of antenatal intervention on neonatal outcomes.

2.3 Exploring literature around antenatal education, maternal obesity and pregnancy outcomes.

As was stated before, obesity during pregnancy is associated with adverse maternal outcomes and most of them have been discussed before. In the following paragraphs, the researcher will discuss the current literature around available literature on the impact of educational programme during pregnancy on pregnancy outcomes among obese mothers.

2.3.1 Effect of interventions on maternal outcomes

The Netherlands study by Althuisen et al., (2013) included 246 randomized women. Their intervention involved counselling by members of the research team consisting of 5 x 15 minute sessions on weight, physical activity and diet. Counsellors discussed how to control weight gain during and after pregnancy, and how to maintain a healthy lifestyle. The authors concluded that "The lifestyle counselling intervention evaluated in this study did not have an effect on excessive weight gain or postpartum weight retention. Our findings for overweight and obese women, need to be confirmed in a larger randomised trial" (Althuisen et al., 2013, p92). Whereas, Bisson et al., (2014) conducted in Canada, concluded that an individualised exercise training effective in maintaining maternal fitness and limiting gestational weight gain in obese pregnant women. In addition, a systematic review conducted by Oteng-Ntim et al. (2012) concluded that antenatal lifestyle intervention is associated with restricted gestational weight gain and a trend towards a reduced prevalence of gestational diabetes in the overweight and obese population. These findings need to be interpreted with caution as the available studies were of poor to medium quality. Likely, Ruiz et al., (2013), conducted a RCT at 3 primary care hospitals in Madrid, Spain. The Intervention involved light-to moderate-intensity supervised aerobic and resistance exercises (including pelvic floor exercises) performed

3 days a week (50-55 minutes per session) from 9 weeks to weeks 38-39. Authors concluded that "Supervised exercise of light to moderate intensity can be used to prevent excessive gestational weight gain, especially in normal weight women. The effects seemed to be more pronounced in normal weight women" (Ruiz et al., 2013; p 88).

Several randomised controlled trial studies (RCT) were conducted around intervention strategies for pregnant women over the last few years, some of which are mentioned in here:

A study carried out by Asbee et al. (2009) to investigate whether an intervention programme on lifestyle and diet could diminish the excessive gestational weight gain and its adverse outcomes among women of differing BMI levels. Asbee and colleagues (2009) found that women in the study group, which gained less weight, were facing less adverse outcomes than those in the control group. Asbee and colleagues' findings will be compared with the findings of the current thesis with the view to identify similarities and differences as well as the factors, which indicate a successful intervention whether cultural or social. It should be pointed out though that this thesis considers only existing obesity and not gestational weight gain. According to study by Guelinckx et al. (2010) suggests that lifestyle changes including food intake and the level of physical activity are considered an initial trial for the management of obese women. Guelinckx and his colleagues looked at whether a lifestyle intervention with the support of an educational element such as a brochure and active education could enhance dietary habit, physical activity and reduce GWG in obese women. They found that dietary habits were improved in the intervention group compared to the control group. However, the intervention did not impact on levels of physical activity and GWG among participants. Regarding educational intervention in low socioeconomic area there is a study by Olson et al. (2004),

who evaluated the effectiveness of an intervention which aimed to prevent excessive weight gain among normal and overweight women during pregnancy. The intervention consisted of clinical modules and a by-mail education program. Olson and colleagues found that participants in the intervention arm gained less weight than participants in the control arm; however, this was only true for the low socioeconomic class (52% of control group exceeded IOM recommendations, as compared to 33% of intervention group). In this study the researchers collected data in three Maternal and Child health centres with different SES, one of the health centres was in deprived area with low SES. In terms of mail education, it will not work in this region because of low literacy levels of women and thus responding to mails would be a challenge to them. Another study conducted by Polley et al. (2002) examined whether a behavioural intervention program would decrease the probability of exceeding the IOM weight gain guideline. The research identified that normal weight women in the intervention arm were significantly less likely to exceed IOM recommendations compared to those in the control arm; however, a non-significant difference was found among overweight women. This thesis uses IOM guideline during educating women regarding the normal range of weight gain during pregnancy. In addition, Gray-Donald et al. (2000) carried out a study by using social learning theory to enhance and promote women's daily physical activity and dietary intake. The program did not significantly influence any of the outcome measures.

Studies have been conducted which comprised intervention programmes to manage weight gain during pregnancy and healthy lifestyle among obese pregnant women. However, few of these studies performed an evaluation of how effective the programme for obese pregnant women was. In the case of the current study, therefore, an evaluation of the intervention programme was conducted in the study design.

Regarding the available studies which investigated PIH were; a study conducted by Petrella et al. (2013) carried out a prospective study in Italy aimed at evaluating the effect of healthy lifestyle on maternal-foetal outcomes. The author concluded that constant physical activity and a change towards healthy eating, improve nutrients intake and avoids the maternal adverse outcomes associated with overweight/obese women such as PIH", while the findings need to be interpreted with caution because of unclear bias.

Evidences recommended antenatal intervention for this particular women to improve their pregnancy outcomes as systematic reviews conducted by Thangaratinam et al. (2012) included 44 relevant randomised controlled trials (7278 women) showed that lifestyle intervention during pregnancy can reduce adverse pregnancy outcomes including PIH and preeclampsia. Whereas, a study conducted by Dodd et al. (2014), which included 1,108 women who were randomised to a comprehensive dietary and lifestyle intervention delivered by research staff; 1,104 were randomised to standard care and received pregnancy care according to local guidelines, which did not include such information. They concluded that antenatal advice does not improve pregnancy outcomes such as PIH, suggesting other predisposing factors such as maternal age, having PIH in previous pregnancies and family history. Unfortunately, in Kurdistan region there is no accurate data about the prevalence of PIH among pregnant women with different BMI levels. As a consequence, this research will answer the research question that the pregnancy outcomes including PIH, is better among normal weight women compared to obese pregnant women as well as through receiving an educational programme. The rate of PIH will be decreased among obese pregnant women.

Gestational diabetes and available studies were: a systematic review was conducted by Oteng- Ntim et al. (2012), which included thirteen randomised and six non-randomised

clinical trials. The results of the review suggested antenatal dietary and lifestyle intervention in obese pregnant women reduce the prevalence of gestational diabetes (six randomised clinical trials; $n = 1,011$; odds ratio 0.80 (95% confidence interval 0.58 to 1.10). They concluded that antenatal lifestyle intervention was associated with reduced prevalence of gestational diabetes in the overweight and obese population. These findings need to be interpreted with caution as the available studies were of poor to medium quality.

An Australian study conducted by Harrison et al., (2013) which provided dietary advice, simple healthy eating, and "physical activity messages" and weight gain self-monitoring. Also included "regular self-weighing as a key behavioural strategy". Authors concluded that "Results indicate that a low-intensity lifestyle intervention, integrated with antenatal care, optimizes healthy GWG and attenuates physical activity decline in early pregnancy. Efficacy in limiting weight gain was greatest in overweight women and in high-risk ethnically diverse women" Harrison et al., 2013; p 904)

Regarding Preterm labor; A study conducted by Petrella et al (2013) conducted a prospective study in Italy, aimed to evaluate the effect of healthy lifestyle on maternal-fetal outcomes, the study found that the occurrence of Preterm birth was lower among women in intervention group. Another study by Phelan et al., (2011) conducted in USA, which included 401 randomised women. Recruited women were provided with standard care plus a behavioural lifestyle intervention. The Fit for Delivery intervention included a face-to-face visit with an interventionist at the onset of treatment who discussed appropriate weight gains during pregnancy, physical activity (30 min of walking most days of the week), and calorie goals (20 kcal/kg); emphasis was placed on decreasing high fat foods, increasing physical activity, and daily self-monitoring of eating, exercise,

and weight. Body-weight scales, food records, and pedometers were provided to promote adherence to daily self-monitoring. Automated postcards that prompted healthy eating and exercise habits were mailed weekly. All women in the intervention received 3 brief (i.e. 10–15 min) supportive phone calls from the dietitian during the intervention. Women in the control group received standard nutrition counselling provided by physicians, nurses, nutritionists, and counsellors. They concluded that " low-intensity behavioural intervention during pregnancy reduced excessive gestational weight gains in NW women and prevented postpartum weight retention in NW and OW/OB'' women (Phelan et al., 2011; p772).

Caesarean delivery was investigated in the following studies; a Spanish RCT study conducted by Barakat et al., (2011), Their intervention included 35- to 45-minute exercise sessions 3 times per week from the start of the pregnancy (weeks 6-9) to the end of the 3rd trimester (weeks 38-39) - an average of 85 training sessions. Exercise intensity was light-to-moderate and was supervised by a fitness specialist in groups of 10-12 women. Authors concluded that a moderate physical activity program that is performed over the first, second, and third trimester of pregnancy improves the maternal perception of health status. Similarly, a study conducted by Asbee et al. (2009) found that women in the study group gained less weight and were facing less adverse outcomes than those in the control group. Regarding induction of labour which was investigated by Guelinckx et al. (2010) suggests that lifestyle changes including food intake and the level of physical activity are considered an initial trial for the management of obese women. They found that dietary habits were improved in the intervention group compared to controls group. However, the intervention did not impact on adverse pregnancy outcomes. Similarly, Moses (2009) conducted randomised controlled trial. The dietary advice by dietitian was

individualised with specific mention of the energy and nutrient balance to achieve normal weight gain during the 3rd trimester. The author concluded that there were no significant differences regarding the prevalence's of induction of labour in the baseline characteristics of the 2 groups.

So far, according to the above literatures, there is a variation in outcomes from such a programme. The current researcher tends to develop an educational programme and applied in local region to see if the programme makes any differences.

2.3.2 Effect of intervention on neonatal outcomes

There is robust evidence to suggest that maternal obesity is linked to adverse fetal and neonatal outcomes such as birth defects (i.e. neonatal neural tube defect (NTDs) and spina bifida), still birth and macrosomia. In the following paragraphs the research will discuss the available literature around impact of educational programme during pregnancy on pregnancy outcomes.

Moses et al., (2014) conducted a parallel-arm RCT in Australia included (691 randomised). The intervention involved a low glycaemic diet from 12 to 16 weeks' gestation for the remainder of pregnancy (compared with conventional healthy eating). Women received a detailed dietary education tailored for the group assignment at baseline there were no differences in the macronutrient distribution in the diets, only the substitution of carbohydrate-rich foods with low GL alternatives in the experimental group. Information booklets were provided. Four contact points with a research dietician were planned (first visit, phone call, midway and final visits) to collect data and ensure adherence. Authors concluded that "A low-intensity dietary intervention with an LGI diet compared with an HE diet in pregnancy did not result in any significant differences in

birth weight, foetal percentile, or PI. In conclusion, the outcome of this study was neutral. Infants of women instructed to consume LGI CHO foods during pregnancy were of normal size and had a similar PI to those of infants of women who received conventional HE advice" (Moses et al., 2014;p 443).

Haakstad (2011), conducted another RCT study in Norway. The intervention included Exercise (60 minutes supervised aerobic dance at least twice a week for a minimum of 12 weeks) (n = 52). Women in the exercise group were advised to have moderate, self-controlled physical activity on the remaining weekdays. Authors concluded that "Regular participation in aerobic dance exercise can contribute to significantly reduced weight gain in pregnancy." However, "not associated with a reduction in birth weight" (Haakstad, 2011, p.2).

While, those included studies who investigated Birth weight as an outcomes of their studies were; De Oliveria Melo (2012) conducted RCT Brazil provided participants with supervised moderate-intensity exercise (initiated at 13 weeks or 20 weeks) vs control.

Sessions consisted of warming up and stretching exercises, followed by supervised walking 3 times a week in the open air. Participants were supervised by physical education professionals and medical, physiotherapy and nursing students. Authors concluded that moderate intensity walking improved the physical fitness level of healthy pregnant previously sedentary women without affecting foetal-placental blood flow or foetal growth (De Oliveria Melo, 2012).

RCT study conducted by Louie (2011) included 99 randomised, provided participants with a healthy low-GL diet of protein (15%-25%), fat (25%-30%) and carbohydrate (40%-45%) (Versus healthy high-fibre diet with moderate GL, similar to population average). Participants attended at least 3 face-to-face visits with the study dietician for

monitoring adherence and encouragement. Intervention began after 29th week. Authors concluded that "In intensively monitored women with GDM, an LGI diet and a conventional HF diet produce similar pregnancy outcomes". They suggested that because the intervention began after the 29th week gestation this may have attributed to the lack of difference.

A recent trial named healthy eating and lifestyle in pregnancy (HELP) by John (2014) a protocol for a cluster-randomised trial to evaluate the effectiveness of a weight management intervention in pregnancy in UK. Target recruitment of 570 pregnant women aged 18 years or over, with a BMI ≥ 30 (kg/m²) and between 12 and 20 weeks' gestation. Interventions Nutrition and exercise (weekly 1.5-hour weight management group) vs usual care and 2 leaflets giving advice on diet and physical activity. The author stated that this intervention could potentially have an impact on the women taking part during their current pregnancy but it could also equip them with weight management and healthy lifestyle skills they can use in the future. Benefits to public health could be far reaching; pregnancy is a time of significant change within a family at which women who could benefit from weight control are accessible and may be readily motivated, and any change to lifestyle could influence families' behaviour in the longer term.

Overall there are inconsistencies in findings of current literature regarding the effectiveness of antenatal educational programme on pregnancy outcomes including mother and new-born. The researcher of the current study will conduct the intervention programme to see if when women are provided with educational programme, it can decrease the chance of occurrence of adverse pregnancy outcomes.

2.4 Summary

In this chapter the researcher presented an overview of the search strategy used to find literature. The area for discussion was impact of antenatal education on pregnancy outcomes among obese women. The first section discussed the available literature about impact of education pregnancy outcomes, secondly it presented the available literature around the influences of education on neonatal outcomes. The next chapter will present the research methodology, choosing research method and its rational will explored.

CHAPTER THREE: METHOD AND METHODOLOGY

3.1 Introduction

This chapter comprises the discussion of the methods used in this study. It discusses in the following order: first the research aims, the rationale for conducting the study and secondly, the research methodology of a mixed-method approach, including the strategies for sampling techniques, the research population and sample size, and sampling inclusion and exclusion criteria. The third part entails the development of the antenatal educational programme development. Part four reviews the data collection tools, including closed ended (pre- and post-study) questionnaires and Likert-type scale questionnaires, focus groups, field notes and telephone interviews. It also provides the rationale for selecting the respective tools including their development, their reliability and validity, and an explanation of the data collecting and analysis process. Data collection process and researcher role during research process are also discussed, as well as the description of the statistical techniques applied to the quantitative data during data analysis and qualitative data analysis including criteria for assessing quality of mixed method research. Finally, part five discusses ethical considerations.

3.2 Part one

3.2.1 Research Aims

This study is a feasibility study of educational programmes, exploring the appropriateness of an educational programme for obese women in Kurdistan and its influence on pregnancy outcomes with a view to undertake a larger randomised controlled trial.

3.2.2 Research Objectives

The main research objectives are:

- To assess the acceptability of an antenatal educational programme for obese women in Kurdistan (the intervention).
- To assess participating women's level of compliance with the intervention.
- To identify any areas for improvement to refine the intervention accordingly.
- To assess the influence of an educational programme on the pregnancy outcomes of obese women attending primary health centres in a large city in the Kurdistan region of Iraq, by comparing pregnancy outcomes between obese women ($BMI \geq 30$) attending an educational programme (intervention group) with those who are obese and did not attend an educational programme (control and baseline group). To explore obese women's experiences of an educational programme and their perceptions of benefit to pregnancy outcomes.

3.2.3 Measured outcomes and anticipated outcomes

A/ Primary outcomes to be measured for all groups include:

1. Maternal outcomes during pregnancy including pregnancy induced hypertension, gestational diabetes mellitus, gestational weight gain and preterm birth.
2. Labour outcomes including mode of delivery, prolonged labour, and prevalence of episiotomy and induction of labour.
3. Neonatal outcomes including Apgar score, birth weight, stillbirth, macrosomia and birth defects.

B/ Secondary outcomes for intervention group only

1. To provide an understanding of the obese women's experience of attending the education programme during pregnancy.
2. To identify the perceived benefits and limitations of the educational programme and its value in order to inform its on-going development.

C/ Anticipated outcomes for intervention group

3.2.4 Research questions

This study includes the following research questions:

1. What are the pregnancy outcomes for normal weight women (baseline group)?
2. What are the pregnancy outcomes for obese women (control group)?
3. What are the pregnancy outcomes for obese women attending educational programmes (intervention group)
4. Do normal weight women (baseline group) have better pregnancy outcomes when compared to groups consisting of obese women (intervention and control group)?
5. Do intervention group (obese pregnant women with educational programme) have better pregnancy outcomes than control group (obese pregnant women without educational programme)?

3.2.5 Research Hypothesis

The project tests the hypothesis that normal weight women have improved pregnancy outcome compared to obese pregnant women (intervention and control group). And obese women who participate in a health education program (intervention group) have improved pregnancy outcomes compared to those obese women who do not participate in the program (control group)

The project tests the hypothesis that obese women who participate in a health education program (intervention group) have improved pregnancy outcomes compared to those obese women who do not participate in the program (control group).

3.2.6 Rationale for conducting this study

Based on an extensive literature research, there is limited evidence that effective intervention for obese pregnant women can reduce adverse pregnancy outcomes (Campbell et al., 2011; Oteng-Ntim et al., 2010). In addition, some trials have suggested the need for an evaluation of intervention programmes (Moholdt et al., 2011; Harrison et al., 2011). Answering the above research questions helped the researcher to evaluate whether an educational programme has an impact on reducing adverse pregnancy outcomes in a Kurdish setting. The results may be used by other researchers who seek to investigate into related topics in the future, and well as practitioners who seek to implement educational programmes. The results may also be used to shed light on the body of literature about obesity and the value of an educational programme for pregnant women in the Kurdish cultural context. Hence, the study fills an important gap regarding whether an intervention programme for obese pregnant women is feasible and effective or not. In addition, this study adds to the body of knowledge about educational strategies most appropriate to the Kurdish culture and society.

3.3 Part two

3.3.1 Research Methodology

Research generates and expands existing knowledge, which is regarded as a basic element for all disciplines. This requires a systematic, well-defined process to answer the study questions (Polit and Beck, 2013). According to Clark and Creswell (2014, p.5), research methodology is defined as “*an approach for doing the research process as a whole*

including the design to answer research questions”. The research method is described as a technique used to collect and analyse data. The current researcher used Creswell’s framework which outlines the research approaches including philosophical worldview, research designs and research methods (see Diagram 3.1).

In this research, both a positivist and a constructivist framework have been chosen to conduct a mixed-method study. Mixed method study has been carried out sequentially, combining the research methods of using questionnaires, focus groups, descriptive and inferential statistical analysis and thematic analysis.

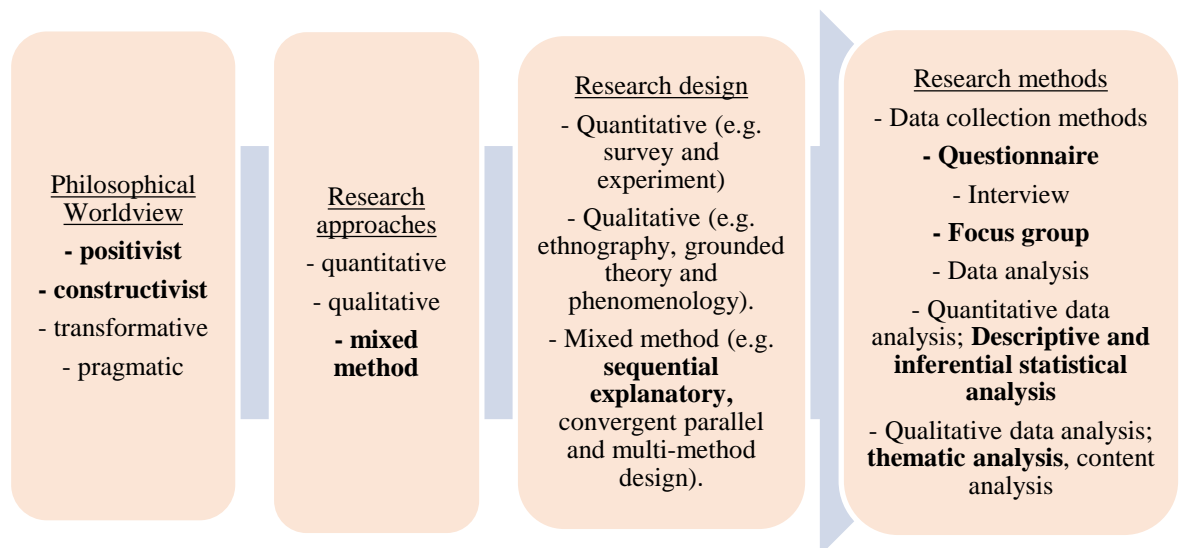


Diagram – 3.1- Framework research – (Clark and Creswell, 2014, p.5)

The following sections discuss each point in detail.

3.3.1.1 Philosophical worldviews

In this research, both a positivist and interpretive approaches were used. Explaining these two worldviews, the rationale for using them, how they were used and how these were combined in one study, will be discussed in more detail in the following sections.

A/ Positivism

Positivism was developed in the nineteenth century by Comte, Mill, Durkheim, Newton, and Locke (Smith, 1983), and lately by Philips and Burbules (2000). Comte saw it as a necessary step in the development of a social science to discover natural laws that applied to society and that would operate on the social level and relied specifically on scientific evidence (Creswell, 2007). This specific approach identifies how we respond to our claims of knowledge while researching the behaviour and actions of humans (Clark and Creswell, 2014). It is also reductionist because it presents the idea as a discrete and small set of variables. According to this philosophy, there are many laws which govern this world and they should be tested and verified. This approach can be described as a deductive process used to test theories through quantifying the collection of the data as well as its analysis (Bryman, 2015). Positivism is the most common research philosophy used to undergird quantitative research. Positivism proceeds from theory to data collection after which the theory is either accepted (with additional tests if needed) or refused (Clark and Creswell, 2014; Johnson and Onwuegbuzie, 2004). Thus, in seeking to measure pregnancy outcomes among obese pregnant women in Kurdistan region, the positivist approach is appropriate for the first part of the study and to answer the research question concerning the measurable pregnancy outcomes, such as weight gain during pregnancy, mode of delivery and the baby's weight.

However, the positivist approach is contested. A major critique of the positivist approach is that it does not provide an in-depth understanding of human beings and their behaviour. Instead, it might leave the researcher with a superficial view and minimal understanding of the phenomena (Denscombe, 2008; Crossan, 2003). To overcome these issues, the

researcher has complemented the positivist framework with an interpretivist/constructivist approach.

B/ Interpretivist/constructivist

This philosophy became visible in the first decade of the 20th century. Historically is initially expounded in anthropology, sociology, and the humanities. In opposition to the positivist philosophy, the interpretivist/constructivist researcher seeks to understand human being based on observation of their behaviour. The human being is not an object their perceptions, feelings and behavioural are all influenced by the surrounding environment (Parahoo, 2014; Creswell, 2013). Interpretivism favours the inductive research design. Inductive research is concerned with generating new theory emerging from the data and uses words and images to understand people's life experiences and views (Crossan, 2003). Interpretivist/ constructivist studies do not start with the theory, but the researcher tries to develop the theory from observing experiences of the human being, so qualitative research will be appropriate for this philosophy (Clark and Creswell, 2014). According to Proctor (1998), culture, reality, construction, gender and beliefs are significant factors in human life. This study has benefitted from the interpretivist/constructivist perspective, as in Kurdistan, women come from various social, educational, cultural and demographical backgrounds and therefore, their experiences differ, such as in respect to an educational programme during pregnancy. Furthermore, the fundamental pillars of the educational programme were =drawn from the United Kingdom, which has a different cultural and social context. Therefore, to understand women's perceptions of benefits to pregnancy outcomes, qualitative methods have been selected in addition to the quantitative methods to conduct a mixed-method study. To summarise, the researcher has started with a positivist approach to learn about

the influences of educational programmes on pregnancy outcomes, and in the second part of the study, applied interpretivist perspectives to explore women's experiences regarding the education which they received.

Principally, there are two broad approaches for conducting research in social sciences - quantitative and qualitative (Teddlie and Tashakkori, 2013; Creswell and Clark, 2007). Quantitative research studies mostly follow positivist perspectives. The main aims for this method is to collect data to quantify and using statistical analysis (Crossan, 2003). In general, this type of research focuses on testing hypothesis and is suited to answer the question "what"? By contrast, qualitative studies follow interpretivist perspectives (Creswell, 2009), mostly based on word and image to understand human behaviours and social constructs (Crossan, 2003). This type of study is more suited to explore the question "why". There are arguments and debates about which research approach is better, some scholars noted a big difference between these two methods. For instance, Robson (2002) argues that the basic differences between them is return to their ontological positions. For example, quantitative research focuses on addressing social and health problems in a perspective that the problem exists, whereas qualitative researchers are more likely to focus on the social and health problems with the interconnections between interviewer and interviewees (Crossan, 2003). So as a result, the quantitative and qualitative methods individually cannot answer the research questions for the current study. But using both methods together may provide an appropriate methodology to investigate both the "what and" "why" perspectives.

3.3.1.2 Quantitative design:

In the quantitative approach, the two central designs include survey and experimental design. Survey design includes cross sectional and longitudinal studies using

questionnaire and structured interview to provide numerical description for attitude, behaviour and opinion of target populations and generalise from this to an entire population (Clark and Creswell, 2008). Experimental research design in turn seeks to identify the effects of specific treatments on the outcomes. Research uses a treatment for specific group and withholds treatment from the other group to see the differences between the outcomes for both groups. In the experimental design there are true experimental designs when the sample is randomly selected, and quasi experimental design when non-randomisation is used (Bryman, 2015; Creswell, 2009).

In the current study, the researcher used a true experimental design because she randomly assigned participants in her study groups and explored one group of obese pregnant women in an educational programme and the other group of obese pregnant women who did not experience the education programme. These groups were observed and their pregnancy outcomes recorded as a control.

Research bias may come from the researchers or may result from the methodologies selected (Creswell, 2009). However sampling from the population occurs first and this reduces selection bias.

Randomisation reduces allocation bias by allowing random allocation of subjects to an experimental or control group (Creswell, 2009). All participants would have the same opportunity to be assigned to the experimental group(s) or to the control group. Researcher bias is reduced when researchers are blinded to the control or experimental groups (Dawson, 2002). This would allow researchers to interpret results objectively and avoid becoming subjective. However, there are instances where blinding to which group receives the intervention or the placebo is difficult to carry out especially if there are fewer participants involved in the study (Dawson, 2002) or due to the nature of the

intervention where the researcher has to know beforehand which group should receive the intervention or the placebo.

An experimental study design requires a research question, which can be answered through experimentation (Roberts and Priest, 2010) and there is usually an experimental and a control group. The methodologies used in the research could either be standardised or have been utilised by earlier researchers or they could have been created by the researchers to meet the aims and objectives of the study. The methodologies would allow researchers to compare the experimental group(s) with a control group and determine whether there is an effect on the experimental group (Miller and Crabtree, 1994). With randomisation of participants to group, this design could be used to establish a cause and effect relationship and it would be important that an appropriate sample is obtained before proceeding with the study to enhance the generalisability of the findings.

Smaller samples would increase the risk of subjectivity and affect the generalisability of the study (Dawson, 2002) as results obtained from small samples are not generalizable primarily due to sample size and also because researcher bias is more probable in case of small sample size. A robust study would require a large enough sample to help ensure that the results could be generalised to a larger and more heterogeneous population (Polit and Beck, 2009). Results produced in this type of study design could be compared to earlier or similar studies to determine whether the intervention truly has an effect.

3.3.1.2.1 Randomised Controlled Trial (RCT)

The use of an RCT fits the ontological question of seeing reality as objective and knowledge as systematic, while qualitative methods allow for knowledge to be dependent on how one finds meaning on the actions and perception of people and reality as subjective. An RCT fits under the paradigm of positivism since it arrives at knowledge

through a systematic inquiry. For instance, this methodology would require randomisation of samples, use of a control and experimental group, and statistical tests to determine if there is a significant difference between the interventions used on an experimental group (Roberts and Priest, 2010).

RCTs begin with a hypothesis to be tested, which must have outcomes that can be measured accurately. Such a study needs to be designed to allow an exact evaluation of this hypothesis. A protocol forms the planning stage. This is important because it allows the researcher to receive advice and criticism at a point where it is still possible to change the design and correct any design flaws (Kendall, 2003).

RCTs are used to investigate the efficacy of healthcare interventions and provide the most rigorous way to determine whether a cause-and-effect relationship exists between intervention and outcome (Sibbald and Roland, 1998). RCTs are often considered to be the best study design for this purpose, since the act of randomisation of study subjects to receive or not receive the intervention typically ensures that all other possible causes are distributed equally between the two groups. Therefore, any statistically significant differences between groups can be attributed to the intervention and not to some other unknown factor (Stolberg et al., 2004).

3.3.1.2.2 Sampling

The first stage in setting up an RCT is to choose a representative sample of the study population from which to set up intervention and control groups. One difficulty is recruiting participants, particularly in certain areas of medicine where evidence supporting a particular intervention is well known, making participants less willing to try an alternative (McMahon, 1994). Problems in recruitment may be solved by carrying out studies in more than one geographical location (Burns and Grove, 1999; Walker,

2005).

A sample size calculation needs to be performed to ensure that sample size will allow the study to detect clinically important differences between the experimental and control group (Weinberg, 2002). In order to do this, the researcher needs to identify suitable primary outcome measures and minimally important differences for that outcome to be detected. From this information, a researcher can calculate a sample size which will detect the clinically significant differences to a certain degree of power. Alternatively, sample size can be based on previous experience, for example, information from the literature or from a pilot study (Kendall, 2003). Once this is done, decisions can be made about the time, money and other resources needed for a full study.

3.3.1.2.3 Randomisation

Assigning participants to one of two or more groups randomly is the basis for establishing a cause and effect relationship for an intervention and is seen as one of the cornerstones of RCTs (Altman, 1991; Kendall, 2003). Randomisation is the process of assigning participants to intervention and control groups, assuming that each participant has the same chance of being assigned to any particular group, and is important in reducing allocation bias (Kang et al., 2008; Fleiss et al., 2003).

Random allocation to intervention groups provides the only method of ensuring that the groups being compared in a study are on an equal footing at the outset (Schulz, 2001). It is important to show at the analysis stage that potential confounding variables are distributed equally between the two groups, although the researchers need to be aware that unpredicted differences in confounding variables may occur, especially in small samples (Schulz, 2001, Kendall, 2003).

A true random allocation procedure needs to be used and where possible, these allocations need to be hidden from the researcher until recruitment is finalised to avoid bias at the stage of placing participants in groups (Kendal, 2003; Forder et al., 2005;Schulz, 2001). Failure to conceal may potentially result in a non-randomised trial where analysis requires adjustment for potential confounding variables. In RCTs, in addition to attempting to avoid bias through hiding the randomisation process, there is also blinding, or the masking of the intervention (Forder et al., 2005;Walker, 2005). In single blinding, either the participant or researcher does not know which group the participant has been placed in. In double blinding neither the participant or the researcher knows which group the participants has been placed in.

This is possible in certain clinical trials, such as drug trials. However, it is not always possible to blind participants to interventions as interventions are visible to participants (Forder et al., 2005). This is particularly true of interventions encountered in nursing research. The Hawthorne effect may be observed in trials where there is no blinding. Subjects may change their behaviour or respond in a particular manner, simply because they are aware of being observed (Clifford, 1997; Walker, 2005).

3.3.1.2.4 Validity

The rigour of RCTs is seen to maximise their internal validity and increase the likelihood that the findings will be generalisable to other study settings and populations (Walker, 2005). However, RCTs can sometimes overestimate the magnitude of the associations between intervention and outcome (Concato et al., 2000). Furthermore, there may be shortcomings in the design and implementation of RCTs and/or incomplete reporting of methodology (Grossman and MacKenzie, 2005). Any reporting of RCT will have to be in accordance with CONSORT guidelines to help maintain the quality of reporting.

However, the main criticism of RCTs is their low external validity (Sanson-Fisher et al., 2007). They use eligibility criteria that result in a homogenous group of participants that may not be typical of the general population (Walker, 2005). This may be because the study population is unrepresentative, for example including participants from only teaching hospitals. In addition, the exclusion criteria might be restrictive, for example excluding more severely ill individuals, or a group of participants might be unusually enthusiastic or negative about the intervention. Finally, both intervention and control groups might have better care than the general hospital patients because of implementing strict study protocols (Sanson-Fisher et al., 2007).

Despite these potential limitations, the RCT is viewed as the ‘gold standard’ of evidence on which to base clinical decision making. RCTs also reduce allocation bias and allow researchers to balance unknown prognostic factors at baseline, which no other type of study design allows (Stolberg et al., 2004).

3.3.1.2.5 Pilot intervention studies

Feasibility studies are often conducted to assess the viability of conducting a larger-scale study, such as an RCT (Lancaster et al., 2004). They are preliminary or initial test studies conducted on a small scale before the main research, so that the design of the research or the purpose and approach to research can be checked, corrected or even improved (Haralambos and Holborn, 2000).

A feasibility study allows researchers to assess the process of the study. This includes deciding on recruitment and retention rates, as they will see the number of participants available and how willing they are to participate (Kendall, 2003). The resources needed can also be measured, including time and costs, allowing the recruiter to collect pilot data on, for example, the time needed to fill out the questionnaire (performance sheet) or the

costs of entering the data onto a computer. Management issues such as the organisation of personnel and data at the recruitment centre can be analysed. Scientific questions such as outcome measurements can be examined and it allows for the testing of the adequacy of research instruments (data collection forms, questionnaires). It can also be used to improve the internal validity of questionnaires prior to their wider use (Thabane et al., 2010).

The main advantage of feasibility studies is they can identify any issues that indicate that a change to the protocol is needed (Kendall, 2003). These include potential practical problems in research, giving indicators of where the research protocol might not be followed. However, pilot studies have a number of limitations, including the possibility of making inaccurate predictions or incorrect assumptions based on the data generated, particularly as study samples are small (Lancaster et al., 2004).

Pilot studies are not suitable for the understanding of case studies which are more specific, but they can be performed before large scale quantitative research. Pilot studies are carried out over a sample of the relevant population but participants of the pilot should not participate in the main research to avoid bias, influence and familiarity (Haralambos and Holborn, 2000).

In social sciences, pilot studies are usually small scale studies primarily used to judge feasibility of the main research and also to identify any issues or flaws in design of the main research (Haralambos and Holborn, 2000). After the pilot study, designs or their protocols may be changed if required. Several critics have questioned the value of pilot studies due to their small sample size, but as pointed out by Lancaster et al. (2004), the aim is not to find statistically significant effects but to determine whether it is feasible to

carry out a study to find such effects. Pilot studies do provide insights on strategy, design and feasibility of an educational programme for obese pregnant women.

In fact, there is no formal data about pregnancy outcomes in Kurdistan region in order to help the researcher to work on it. In this researcher the researcher tried to pilot an educational programme for obese pregnant women and find out if it's feasible or not to recommend for future larger trial

3.3.1.3 Qualitative design

Qualitative research methods were developed by social and behavioural sciences to focus on exploring individual and group behaviour, their knowledge, attitudes, beliefs and fears, in order to gain an understanding of the meaning and experiences of human life (Creswell, 2009). It can be applied complementary to quantitative research, giving different perspectives and answering different research questions within a particular field (Burns and Grove, 2005).

According to Becker (1986), qualitative researchers consider their method of interviewing and observation helpful in getting them closer to study participants' perspective and these research methods have been used widely to assess acceptability in both nursing and other areas of medicine (Feeley et al., 2008). Participant perspectives and opinions and researcher perceptions following observation could complement any data obtained to strengthen the findings.

Qualitative methods fit under the post-positivism paradigm, since the reality is dependent on how a person perceives it to be, and knowledge is seen as dependent on how people create meanings. Analysis of data arising from a qualitative study has now become rigorous and methodological. Use of an appropriate framework for analysis of the results helps in making the results reliable.

Qualitative research is useful when working with small samples and is generally not meant to be generalisable in terms of the findings obtained. Hence, it is difficult to apply qualitative findings to other study settings or populations. To counter this, qualitative researchers have argued that the transference of terms such as reliability, validity and generalisability to a naturalistic paradigm is inappropriate in demonstrating the robustness of this type of research (Creswell 2009). Consequently, other approaches to assess the methodological rigour of qualitative research have been proposed (Power and Williams, 2001), such as transferability to assess validity, trustworthiness and goodness. Qualitative research is valuable for investigating the subjective experiences of individuals (Carr, 1994), and provides insights into beliefs, opinions, emotions and relationships, which cannot be assessed using a quantitative approach.

Focus group

Focus groups involve participants in in-depth discussion about selected topics (Rabiee, 2004). Ritchie et al., (2013) and Polit and Hungler (1995) suggest that focus groups have been acknowledged as the most popular technique for gathering data about health problems. The researcher chose focus group as a method for collecting qualitative data from women who were participating in the intervention programme. Participant observation and interviewing are other types of qualitative data collection methods. With participant observation, data are collected by a researcher who acts as an observer, such as a member of the nursing staff. The researcher should aim to become a part of the population being studied, in order to fully gain an understanding of attitude and beliefs of the individuals within this population. The researcher may either use a pre-prepared list of specific observations that they are looking for, or alternatively record whatever they observe for future analysis.

Interviews may be either unstructured (open interview style), structured (closed interview style) or semi-structured (a combination of the two) and are carried out on an individual basis. Using this approach, the researcher can gain detailed information on each study subject, with some people feeling more comfortable about expressing their views to the researcher in a one-to-one situation (Guest and Mac Queen, 2008). The main drawbacks of individual interviews are that they often fail to produce the richness of data that debate among a group can generate, while the diversity of the data gathered can be difficult to analyse, since a content analysis technique must be employed (Dawson, 2002).

Regarding the sampling, in the qualitative arm, there is no standard method for determining sample size (Denscombe, 2008), instead data collection proceeds until saturation points are reached, and a purposive sample is most commonly used (Polit and & Beck, 2008). Patton (2002), identified different strategies for purposive sampling in qualitative research. “Homogenous sampling” is one of these strategies required which was used in current study, in order to obtain data from specific group with the same experiences (which was antenatal educational programme when they received) and same background.

So, the researcher used an RCT in the quantitative arm of the study to pilot an effect of an educational programme on pregnancy outcomes. Apart from that, focus group discussion was used in the qualitative part of the study in order to explore the experiences of those women who received the educational programme regarding their perceptions of benefits and limitations of the programme on their pregnancy outcomes.

3.3.1.4 Mixed methods designs

For the current study, as stated in the previous section, quantitative and qualitative data were collected and combined to answer the research questions. This approach is called

mixed methods. According to Creswell (2014, p.3) “mixed method is a design which is located in the middle of qualitative and quantitative because it includes elements of both designs”. Harris and Brown (2010) defined mixed method as a design which the researcher combines quantitative and qualitative data collection and analysis to address a research question. This approach helps the researcher to obtain a complementary and different data on the same phenomena, through comparing, validating or expanding quantitative with qualitative results (Creswell, 2009; Tashakkori and Teddlie, 1998).

A quantitative approach tends to collect closed-ended responses while qualitative data commonly leads to open ended responses. The idea of mixed method or multiple methods in research design has emerged from the recognition that all single-applied methods have bias and weaknesses, and a mixed-method approach can neutralize weaknesses for each type of data (Clark and Creswell, 2014). By using mixed method design in this study, a research problem which could not be addressed by quantitative and qualitative alone was answered. In order to collect both types of data (quantitative and qualitative), various types of data collection methods, such as, closed-ended questionnaire, Likert scale questions, focus groups, and writing observational field notes, were used.

In the mixed method design, there are three factors which have an important role during design of the research, which are timing of data collection, mixing of data and weighting of data (Creswell and Clark, 2007). Time of data collection or time of mixing data includes concurrent and sequential approaches. In concurrent approach, the data is collected at the same time and can be called “one phase” research (Onwuegbuzie and Collins, 2007; Creswell and Clark, 2007). The researcher’s aim in this type is to take a picture of research question in multi-method and through different research instruments. While using a sequential approach, the data is not collected at the same time, but in two

phases with two different samples addressing two different aims, which has been used in this study (Creswell and Clark, 2007). In the current study, the researcher collected data from women who attended or did not attend the educational programme in the first part of the study (quantitative arm). In order to explore the experiences those women who did attend the programme, focus group discussion was conducted afterwards (qualitative arm).

There are three techniques for mixing quantitative and qualitative data. One way to do this is known as merging data. Here data is collected and analysed separately (i.e. the qualitative and quantitative) and then the findings mixed. The next level involves connecting data where they are mixed at the interpretive stage of findings. Finally, data is embedded where it is mixed at the design level (Clark and Creswell, 2014). For the current study, of the quantitative set of data was collected and analysed and based on this, the need for a qualitative analysis emerged. Thus, both data sets are connected. The second type was followed in the current study. In other words, the researcher merged quantitative data during the educational programme based on this result. Then the two data sets were mixed in the interpretation of the findings.

Weighting of data

Weighting of data involves determining whether more focus has been placed on one method over the other i.e. between the qualitative and the quantitative method. It is important to determine if one method is emphasised over the other or whether both methods are given equal importance and therefore have approximately the same weight in the research (Onwuegbuzie and Collins, 2007).

Morse (2003), stated that there are some fields in which one approach can be more dominant such as in psychology studies where quantitative approaches are more

dominant, and the field of anthropology where qualitative approaches are given greater weight.

In the beginning of this study, the researcher had planned to emphasise the quantitative data, to see the pregnancy outcomes among intervention group and then compare them to control groups, to be used as an initial evidence in this region. It also adds to the body of literature around quantitative results about this topic, which are absent in health services statistics in that region. From the quantitative data, it became apparent that there was limited influence on outcomes of obese pregnant women. Therefore, the qualitative arm of the study became pivotal in understanding why the education programme did not have a positive effect. So, the researcher tried to focus on both parts (qualitative and quantitative data) to answer the research question properly.

In mixed method research design, the researcher merges quantitative and qualitative data to answer the research aims. The basic mixed method design includes the convergent parallel design, the embedded design, explanatory or exploratory sequential design and multiphase mixed method design. (Parahoo, 2014; Creswell, 2013; Teddlie and Tashakkori, 2013).

In convergent parallel design, the researcher collects quantitative and qualitative data roughly at the same time and merges the information during data analysis by comparing the two sets of data. In the embedded mixed method design, qualitative or quantitative data is included to answer a specific research question within a largely quantitative or qualitative study (Creswell, 2009). Thirdly, in the exploratory or explanatory sequential design, phases of data collection follow each other. For example, in exploratory design, the researcher starts to collect qualitative data and analyse them; then based on the findings, the second phase instruments including variables will be designed. The

challenge for this design is how appropriate the qualitative findings are to make decisions on sample and instruments for a second phase. Whereas, in explanatory design, the opposite type from exploratory, the researcher tends to collect and then analyse data, and also build the data collection tools for second phase (Clark and Creswell, 2008). This type of design is more popular in those sectors where more quantitative orientation is used. The major challenge in this design is having an equal sample size for both phases. Finally, in the multiphase mixed method design, the researcher collects quantitative and qualitative data in different phases and uses both data sets in tandem over time to get an in depth analysis of the programme. This type is mostly used in the evaluation of intervention programmes which can last many years (Clark and Creswell, 2014).

In the current study the researcher has employed sequential data collection. That means, the researcher has collected quantitative data in the beginning of the educational programme (first questionnaire at initial visit) and after completion of the educational programme to evaluate the success by means of Likert Scale and during delivery of the baby the quantitative data (second questionnaire to measure pregnancy outcomes was collected after delivery (2-8 weeks). Qualitative data has also been collected to explore participants' views and experiences regarding the programme. So, the researcher collected different types of data throughout the programme. As a result, explanatory sequential mixed method design was regarded as a suitable design for the study. In addition, sequential designs were appropriate because both discrete phases are dependent on each other. For more information see the diagram (3.2)

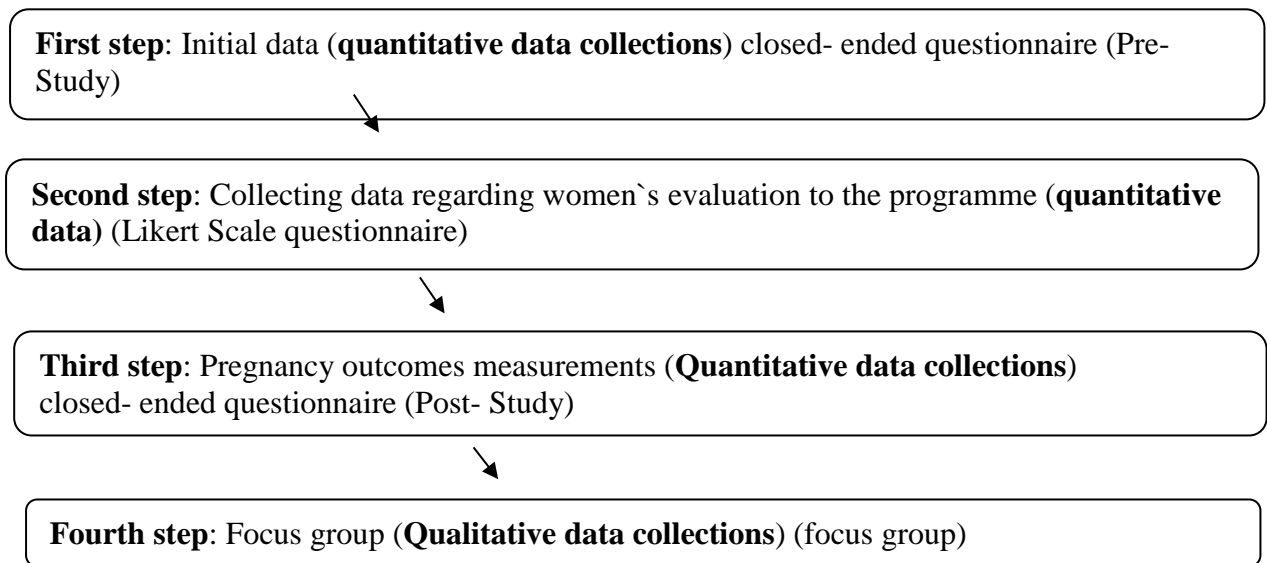


Diagram-3.2- The Multi method mixed method design of the study

Therefore, as is shows in the diagram 3.2, quantitative approach addresses the first aim of the study as it measures adverse pregnancy outcomes among pregnant women. The qualitative approach answers the second aim of this study to explore women`s experiences regarding their perceptions of benefits and limitations of the study.

3.3.2 Setting of the study

There are sixteen Maternal and Child health centres in a large city in the Kurdistan region of Iraq- (MOH, 2013), which provide mother and child health care services. This study was conducted at three health centres (A,B and C) in this city; one of the health centres (health centre A) offers delivery services in addition to their maternity and child care services, while the other two offer maternal health care services and urgent care only.

For the current study, the above health centres were selected purposely as they serve populations of different socio-economic statuses. In the city where the study took place, it is easy to classify people depending on their socio-economic classes. Certain city quarters are more deprived of facilities that provide better living standards than others

and in such, poor housing, low school standard and low quality of food and fruits prevail. Consequently, residents of these areas have a lower socio-economic status and are less educated. Furthermore, they have mostly moved there from the same rural background and hence share certain social values. The majority of these inhabitants are farmers and soldiers. In contrast to these living areas, other areas are more affluent, such as the neighbourhood of health centre B. Here, the inhabitants are highly educated, belong to a high socio-economic class (recognisable by big houses, high standard schools and the availability of high quality food and fresh fruit). Health centre C, is also located in the centre of such a neighbourhood of above-average socio-economic status. Still, a variety of people with different educational background can be encountered here. This research focuses on and compares different socio-economic areas within a large city to reflect the range of experiences among participating women (UNDP, 2012).

3.3.3 Population, inclusion and exclusion criteria

The population of the current study consisted of pregnant women who were attending the Maternal and Child Health Care Centre (MCHCC) for antenatal visits in the above selected centres. Women who could be included in the study were pregnant, with a BMI of either 18.5-24.99 or 30 and above. Recruitment of normal weight women in this study as a baseline has no data available in country about outcomes for this group and it was hoped that a comparison could be made between outcomes in this group and the obese groups.

Primiparous and multiparous women were eligible to be included, and those who booked before 12 weeks gestation, as women with early exposure to education will have better outcomes than later during pregnancy (Crafter, 1997). Women with multiple pregnancies, medical and obstetrical contraindication to exercise (such as heart disease, lung disease,

cervical incompetence (cerclage), severe anaemia, chronic bronchitis, hypertension and any risk of abortion) (Heslehurst et al., 2011) were excluded from this study.

The present study commenced in 2011, literature studies suggested a revision of the Asian BMI classification (Liabsuetrakul et al., 2011; Misra, 2015), and therefore the present study was conducted using the international BMI classification.

3.3.4 Sampling, Sample size and randomization process

Sampling

It was planned to consecutively recruit 200 hundred obese pregnant women. Consecutive sampling involved the recruitment of all obese pregnant women who met the inclusion criteria (and provided informed consent), as they entered the study setting (Solomon et al., 2009). Hundred obese pregnant women were recruited from selected state health centres and were randomised in a 1:1 ratio to receive either the educational programme or not.

Sample size

Deciding on sample size is not easy especially for those studies which need statistically significant results as this will affect the power of statistical tests. It was intended to recruit 200 obese pregnant women from three health selected health care centres for inclusion in the pilot study. Contrary to expectations, no women withdrew from the study. However, if they had, their data was going to be removed. In feasibility study, recruitment finished when the target number of obese pregnant women had joined the study.

As a feasibility study an accurate sample size was not calculated. For the randomised controlled trial guidance needs to be sourced from a statistician and an epidemiologist to ensure the sample size is sufficient to assess for primary outcome, which should be gestational. Diabetes. Because this was a feasibility study, a formal sample size

calculation was not required. A total sample size of 100 per each group should be sufficient for reasonable estimation of recruitment and attrition rates (Hertzog, 2008). Julious (2005) suggests that as few as 12 participants per group could be required for estimation of means and standard deviations within groups, and the target of 20 per group will satisfy this requirement. But in regarding to rarer events like (stillbirth, congenital abnormalities and admission new-born to ICU the significant statistical differences may not provide any significantly because of the small sample size).

Method of randomization procedure

The sample was taken from those women whose initial visit to the selected health care centres and whose BMI was in the target ranges (30 or above). Sampling took place between November 2012 and January 2014. After that, all eligible pregnant women had their height and weight measured and BMI calculated at their first antenatal appointment. The researcher, with the help of HCPs, counselled eligible women and following consent to participate in the study, randomised them to receive lifestyle intervention or standard care.

Suresh (2011), stated many methods for randomisation such as randomising by computer or simply by throwing dice or side of coin (head- control, tails- case). The randomisation method that was employed in the current study is side of the coin. Factors that influenced the choice of this method include; the small number of participants, lack of computerisation as a formal record. In addition, the side of the coin method was found to be socially and culturally acceptable in the Kurdistan setting.

In the quantitative side, after specifying target population and calculation of sample size, the researcher used randomisation sample strategies in order to answer the research questions and aims. The researcher assigned women into two groups (control and

intervention) to randomise the sample. So the intervention group were start to enrol in an educational programme.

Groups of the study

This study consists of three groups which were:

- 1- Baseline group (women with a BMI 18.5-24.99). The baseline group initially included 99 women within the first three months of pregnancy.
- 2- Obese groups (women with a BMI 30 or above). The group of obese women initially included 193 women within the first three months of pregnancy. After randomization each woman was assigned to one of two groups

A / Control group (women with a BMI 30 or above), including 98 women.

B/ Intervention group (women with a BMI 30 or above), including 96 women

Note// the present study commenced in 2011, literature at the time suggested revisions to the Asian BMI classification (Liabsuetrakul et al., 2011; Misra, 2015, therefore it was not used for this study. The international BMI classification was used for this study.

3.4 Part three; Antenatal educational programme development

3.4.1 Introduction

One of the essential elements in the delivery of Primary Health Care is health education as reported by the Alma Ata conference (1978) is expected to be conducted from the Primary Health Centres (PHCs) of the Kingdom in an effective manner. The national “Plan of Action” for activities of the PHCs, which is revised annually, emphasises that health information on antenatal care and related matters must be properly disseminated so that HCPs can help women can improve their knowledge, attitude and skills for healthy pregnancy and delivery (Rasheed and Al-Sowielem, 2003). Health education is not just teaching people about healthy lifestyle, it also includes helping them to learn how to

improve and get rid of unhealthy behaviour such as smoking and obesity (Crafter, 1997). One of the interesting issues about teaching patient, client and their families is the extent to which such teaching can be considered to come under the umbrella term health promotion (Hughes and Quinn, 2013).

There are three main types of teaching intervention, depending on who does the initiating. Firstly, there is family initiated teaching. In this type of teaching, the family requests for teaching for example "How can my child reduce the risk of a recurrence of asthmatic attacks". Secondly, patient/client initiated teaching. This is the type of teaching when the client/ patient requests, i.e. "How I can reduce my weight after delivery of my babies"? Finally, health care practitioner (HCP) initiated teaching. This type of teaching when the HCPs believe that the client requires for an example, how to administer his or her insulin or the teaching the HCPs believe that the family requires such as how to deal with an elderly patient following discharge. These can present dilemmas such as whether the HCPs should teach the seven-year-old children directly or teach the family of the child instead (Hughes and Quinn, 2013). So, the HCPs should plan for teaching in advance to eliminate errors and omissions. In the following sections, the researcher tends to present the common concepts and theories around adult education and educational strategies.

3.4.2 Adult learning theories

Adult learners are different in their physical characteristics such as age and gender and psychological characteristics such as personality, motivation and intelligence. The common factor among all adult learners is that they have voluntarily decided to learn (Hughes and Quinn, 2013). As Rogers and Horrocks (2010) recognised, one of the characteristics of adult learners is that they are inspired and are open to learning (Rogers and Horrocks, 2010). There are many theories underpinning adult learning. The

Experiential learning approach (Kolb, 2001) is more about learning from experiences and thus emphasises learning by doing rather than by listening to other people such as a nurse educator or teacher in the classroom. The Humanistic approach is another theory underpinning adult learning, which was originally proposed by Abraham Maslow (Hughes and Quinn, 2013). This approach is also referred to as the third force psychotherapy (Hughes and Quinn, 2013). Carl Rogers used the humanistic approach to develop the clientcentred approach in which the client, family and relative have to be included during caring (McLeod, 2007). Using this idea, Rogers also formulated the student-centred approach which allows the student to take an active and engaging role in education. Rogers proposed that teaching through transforming knowledge cannot meet the requirements of today's world because the world is constantly changing. So the teacher has to take the role of a facilitator to help students become selfdirected individuals in order to search and meet the requirements.

Andragogy or Pedagogy style

Maggi Banning (2005) identified that teaching and education has different styles and the most common styles are didactic, Socratic and facilitative. It has been stated that the teaching approached from didactic style to learning facilitation, so as the teacher role and techniques which changed as well (Jarvis, 2006). In recent years, a new term has emerged in literature to describe teaching and learning adult learners which is called "Andragogy". An American educationist called Malcolm Knowles, who is described as leader of man (Andragogy) which is different from leader of children (Pedagogy). Knowles argued that Andragogy is not the opposite of Pedagogy. It can be seen as parallel rather than opposite of each other or they can be used together depending on the teaching circumstance and cultural acceptability. For instance, when the teacher faced a new teaching situation, then

she can use pedagogy for adult learners (Hughes and Quinn, 2013). The aim of the current researcher includes educating adult learners (pregnant women) toward healthy lifestyle including healthy diet and exercise, and its impact on their pregnancy outcomes. To achieve the above aim, the educator tried to provide an educational situation for pregnant women based on adult learning theories especially Andragogy through using Rogers theory which used client centred approach. By using some key principles of Andragogy theory, she proposed a plan for the current educational programme which was received by obese pregnant women in this study.

Yaqinuddin (2013), indicates that in didactic style, or in other words, in the teacher centred style, the teacher is responsible to for the teaching process and control of the teaching environment, whilst, the learner's role is inactive which involves more focusing on and listening to the lecture. In a teacher-centred approach, the teacher acts as the manager of the classroom conditions which they have determined as necessary to bring about desired behavioural changes in the students. While the learner-centred approach is based on the learner experiences, talents and interest, satisfaction in learner-centred style is much higher compared to teacher-centred style (Yaqinuddin, 2013).

In prenatal group discussions, clients do not just hear what the educator or provider says but they learn from each other. As stated by Ho and Holroyds (2002), women are more likely to attend antenatal education to share their experiences with other pregnant women. Stamler (1998) also stated that women tend to attend antenatal classes in order to get answer to their questions. So, a student-centred style was found most useful for educating women during pregnancy in this study. According to the researcher's experiences in this region, in school, university and most educational organisations, the educators usually employ the teachercentred style in their teaching. So, sharing experiences and

socialisation is found to be more interesting and rewarding as it is mentioned in literature. As Stamler (1998) stated that the desire of the seven women which she interviewed was “always for more socialisation” (p. 943) and those who did not have more socialisation reported dissatisfaction. As a Kurdish woman, women are more likely to discuss with other women issues regarding their health.

3.4.3 Content of Health Education within Maternity Care

Over last 50 years, health education has been used in maternity care in western countries. Traditionally, women were dealing with birth and nurturing their babies from observation of their extended families and relatives, information was passed on by close female relatives (Crafter, 1997). The common topics that have subsequently developed within health education programme in maternity care services in general, includes nutrition during pregnancy, exercise, breast care, rest in pregnancy, smoking and pregnancy, communicable diseases during pregnancy such as Rubella, space between pregnancies, antenatal care, weight gain during pregnancy, coping with labour pain and stress reduction (BabyCenter, 2013; Rasheed and AL-Sowielem, 2003).

In western countries, efforts are made by the HCPs to ensure that there is adequate health awareness among pregnant women. However, several studies have shown that many women either lack knowledge or have a lack of concern for certain health risks in pregnancy (Rasheed and AL-Sowielem, 2003; Roth and Taylor, 2001). This indicates that there is the need for a more effective drive to educate women and support them to acquire appropriate knowledge and develop attitudes towards a healthy pregnancy. Though the primary health care centre and antenatal care unit has been established for more than two decades now in Kurdistan region, little is known about the information women need on

pregnancy and the extent to which they have benefited from the knowledge they have acquired through these channels of communication.

Pregnancy can be defined as a period of adapting and changing desired behaviour with ease (Campbell et al., 2011). Therefore, it is regarded as a good opportunity for HCPs to provide women with standardised health education regarding healthy lifestyle. As an illustrative example, Thaver et al. (2009) proposed that health education to mothers, either in the home, primary health centres or hospitals, has a significant impact on women's behavioural changes and improving pregnancy outcomes. It has been suggested that low risk women should receive an education from clinicians regarding healthy diet and exercise regularly. However, evidence suggest that pregnant women do not comply with recommendation (Crozier et al., 2009; Inskip et al., 2009). Debatably, pregnant women should be strongly motivated towards behavioural changes such as eating a healthy diet and physical activity (Gaston and Cramp, 2011). Apparently, changing ones behaviour towards a healthy diet and exercise is not an enjoyable experience, so advice only will unlikely make proper changes: advice and providing information regarding ceasing to smoke, weight management during pregnancy or exercise would not appear to be enough to change positively and making desired changes (Mason and Butler, 2010). So, introducing the mother with standardised health education might have a positive impact on changing women behavioural lifestyle in the Kurdistan region, as a result, it may improve pregnancy outcomes.

A systematic review by Dodd et al., (2008) highlighted that enhancement in health outcomes generally occurs when a multi-faceted intervention approach is used in comparison to single intervention approach. As Amorim et al. (2013) suggested, diet and exercise after childbirth will help women reduce weight gain. Exercise alone is not

enough. Likewise, a review by Gibson et al. (2008) reported that limited asthma education (information only) had no significant effect on the patient's behaviour, while education with written information and audio-visual reinforcement was more likely to alter the patient's behaviour. As a consequence, the key principle of the health education programme used in this research was multifaceted intervention approach including diet, exercise in addition to educational package such as hand-outs and pamphlets in order to make the educational programme more effective.

This study thus also adds to the body of literature around behavioural change theories during pregnancy and fill the gap of knowledge about health education and its effect on pregnancy outcomes in Kurdistan region of Iraq and barrier factors affecting the success of said programme. The need for community and individualised intervention studies for weight maintenance in pregnancy have been the conclusions of several studies (Smith et al., 2008; Krishnamoorthy et al., 2006). As a clinical instructor in maternity hospital and MCHCs, the researcher educated women many times regarding healthy diet during pregnancy but felt that the education was being ignored by women. The question that arises many times is, what is the best way for a midwife to educate women in order to positively impact on their behaviour towards lifestyle and health. So, changing specific behaviour needs theorybased education to make the desired behavioural changes. A recent review by the Kings Fund highlighted several theories of behaviour change (e.g. stages of change model), psychological constructs (e.g. self-efficacy) and types of interventions (e.g. goal-setting) that have been successfully applied to the up-take of physical activity and eating a healthy diet in the general population (Dixon, 2008).

3.4.4 Selecting educational theories: Base of Health Education

The educational intervention that healthy pregnant women should receive from health care practitioner (HCPs) is clear: they should eat a healthy diet and exercise regularly. However, as stated in literature many women do not comply with the recommendations (Inskip et al., 2009). Arguably, pregnant women should have a strong motivation to improve self-directed health behaviours such as diet and exercise; although it would appear that there is a gap between intention and actual behaviour (Gaston and Cramp, 2011). Lifestyle changes, such as diet modification or commencing an exercise regime, are frequently not seen as inherently enjoyable experiences, in other words for many they lack an intrinsic value. Advice alone, it would seem, is unable to prompt individuals into making positive changes to behaviour. This has been observed by many HCPs: advice and providing information regarding health behaviours such as smoking cessation, exercise or diet alteration would appear not be enough to encourage individuals to make the desired changes (Mason and Butler, 2010). There are several behavioural theories which have been employed in changing behaviours. The common behavioural theories are Health Belief Model (HBM), theory of planned behaviour, and transtheoretical model. In the next section the researcher will discuss these theories.

3.4.1 Health Belief Model (HBM)

This was established by Rosenstock in the USA in the 1960s. This theory is widely known and explored in the health related behaviour, understand and predict why individuals took up health screening or prevention programmes (Strecher and Rosenstock, 1997). The HBM originally included four vital concepts which relate to an individual's perception: susceptibility, severity, benefit and barriers. This model suggests that if an individual feels that a health condition is affecting them (susceptibility) it will have negative effect

for them (severity) and their perception for threatening their health is high. Whilst, if they thought that acting to address this threat will have positive consequences (benefit) and will not be of harm to them with the action (barriers), then they are more likely to behave in a protective way.

An illustrative example of this type of theory was used by Ekhtiari et al. (2014). These authors used the Health Belief Model in their self-care educational programme to reduce low birth weight (LBW) among pregnant Iranian women. They randomly assigned women into intervention and control groups. Women in the intervention group received an educational programme to promote self-care behaviours during pregnancy. The control group received routine care. Ekhtiari and his colleagues concluded that the implementation of a self-care educational programme designed on the basis of an HBM on pregnant women was effective in reducing the rate of LBW. Ekhtiari et al. stated that implementing such a programme is economic and valuable. Rosenstock et al. (1997), stated that whether an individual believes and is capable of effectively carrying out behaviour will determine whether they instigate and maintain that behaviour

For example, a smoker who believes they are incapable of quitting is unlikely to be successful in attempts to quit. According to Taylor and his colleagues (2006), the above HBM concepts are based on the assumptions that an individual's health behaviours is determined by their perceptions. Therefore, rational actors are able to change through conscious processing (Taylor et al., 2006). It therefore does not take into account the influence that a habit may have on health behaviours nor does it acknowledge emotional factors such as moods, fear or denial (Ogden, 2003). The author also stated that the role that HCPs have in facilitating health behaviours is also lacking from the model. Furthermore, reviews of the evidence have suggested that the use of the model has not

enabled a better understanding of the influence of environmental components such as social and economic aspects and the way these impact upon health behaviours (Taylor et al., 2006); and that arguably these variables are likely to have a great if not, greater impact than the core cognitive constructs.

Therefore, this theory ignores an individual's social and economic status and this may impact upon the way the individual responds to threats to their health.

3.4.2 Theory of Planned Behaviour

Like the health belief model theory, the theory of planned behaviour has the premise that behavioural intention is linked to actual behaviour (Ajzen, 1985). Ajzen developed the planned theory from his work on the theory of reasoned action and predicts that there are three main concepts for predicting intention, which are attitude, subjective norms and perceived behavioural control (Ajzen, 1991, Ajzen, 1985). First of all, attitude is influenced by two aspects: a behavioural belief and an outcome expectancy; means an individual's belief for doing specific behaviours and their expectation on the consequences will influence their attitude and determination in carrying out the behaviour. Secondly, subjective norms are linked to social pressure that individuals face when carrying out a particular behaviour. This is influenced by a) normative belief and b) motivation to comply. In other words, what is expected of you by significant others (normative belief) and how you feel about that expectation (motivation to comply) will dictate your intention. Finally, perceived behavioural control is regarded as predictive to intended and actual behaviour (Ajzen, 1991).

It has been suggested that one of the reasons for the difference between intention and behaviour may be due to contextual factors, where individuals fail to adequately predict the circumstances requiring them to perform the desired behaviour predictor and thus

some have argued that it is a limitation of the theory (Sutton, 1998). For example, an individual who has decided to reduce their weight through eating a low-fat diet will have changed their shopping and eating habits in order to achieve this goal. However, when invited to a dinner party with friends he/she may not have made adequate provision for such an eventuality. It is recognised that implementation intentions incorporated into goal setting may provide the situational context that enables an individual to perform the behaviour (Webb and Sheeran, 2007). An example of application of this type of theory in antenatal educational intervention can be seen from the work which has been done by Jalali et al. (2014). Jalali and colleagues investigated the effect of planned behaviour theory in promoting preventive behaviour of urinary tract infection in pregnant women in Iran. Jalali and his friends concluded that the intervention based on planned behaviour was effective in promoting preventive behaviours of urinary tract infection.

As with HBM, it has been argued that a further limitation of this theory is that it does not take into account other variables which may affect intention such as emotions (e.g. Fear and threat) or past experience or habit (Perugini and Bagozzi, 2001). However, as Ajzen (1991) argues that past experience and habit are actually key elements to an individual's perception of behavioural control, it would suggest that perhaps they are not overlooked by the theory.

3.4.3 Trans theoretical Model

This model was developed by Prochaska and Di-Clemente (1982) and mostly applies to the field of addictions (such as smoking). Different from the other theories, this theory is based on a set of six discrete stages "Precontemplation (not thinking about changing behaviour), Contemplation (considering change), Preparation (making plans to change behaviour in the immediate future), Action (changing the behaviour), Maintenance

(working to prevent relapse of old behaviour) and finally Termination (the new behaviour is now so ingrained within the individual that they no longer require conscious effort to maintain it)” (Prochaska and Velicer, 1997). Apart from Stage of change (SOC), the theory also includes the concepts of self-efficacy, processes and decisional balance. Di-Clemente and his colleagues (2004) reported that behavioural changes will succeed after more than one attempt. Through using the SOC, it is possible to assess an individual’s ‘readiness to change’ and interventions and appropriate support can then be targeted accordingly. Like other models the TTM, has been subject to criticism; A review of 87 studies which used the SOC in targeting various problem behaviours found that contrary to the foundation of the model, there was no evidence of discrete stages nor was there evidence of sequential movement through the stages (Little and Girvin, 2002). West (2005) is scathing in his assessment of the TTM and suggests that the model is little more than a statement of the obvious;—The author argues that it is not surprising that an individual who is thinking about changing their behaviour is more likely to change than someone who has no intention of change (West, 2005). However, this theory differs from other theories with regard to the fact that behavioural changes are an on-going process and not simply as a dichotomy, and as such has influenced the way in which behavioural change is viewed (Thirlaway and Upton, 2009).

3.4.4 Social Learning Theory (SLT)

SLT stresses that environmental components impact on behavioural changes through observation. This theory was developed by Albert Bandura in the 1970s and the theory has been applied in many fields such as health, education, crime and marketing (Akers, 2011). Bandura argued that behaviours can be learned from observation, imitation and modelling. He further states that modelling is key and people have to identify the

modelling in order to copy the behaviour. So effective modelling is crucial for changing behaviours. Bandura (1977) points out that the four steps which are required in the modelling process are: Attention, Retention, Reproduction and Motivation. That means that in order to learn a new behaviour. It is necessary to pay attention to the behaviour; otherwise the behaviour will not be learned. Next it is important to remember what you observed (retention). Without remembering, and copying of the new behaviour (reproduction) is less likely and with repeating the new behaviour the learner can grasp the behaviour. Motivation constitutes the final step. Motivation may be either punishment or reinforcement. Bandura advanced the theory further through including self-regulation and self-efficacy renaming it the Social Cognitive Theory (1986). Planned theory, SLT and HBM theory have their limitation because they do not account for the effect of emotion on behaviour such as threat and fear, as well as past experiences and habits (Perugini and Bagozzi, 2001).

Given that the current research project was aimed at educating obese women regarding their diet and exercise, and considering the different socio-economic and political factors affecting Kurdish women (as discussed in chapter one), the researcher choose the theory which was applicable to the local context.

3.4.5 Self-efficacy and regulation

Bandura (1977) has defined self-efficacy as an individual's confidence in their ability to attain a goal or shown to be predictive of intent on behaviour. Therefore, if an individual believes that they are capable of achieving a goal by carrying out behavioural changes, then they are more likely to successfully maintain that behaviour (Bandura, 2001). This behaviour requires a conscious effort and self-discipline, a concept de Ridder and de Wit, (2006) refer to as self-regulation. Self-regulation is defined as control within the individual

which drives them to behave in a particular way regardless of behavioural obstacles. It is also noted that behaviour can be affected through external regulation from a number of sources such as social norms and expectations towards gift and reward (Deci and Ryan, 2002). Hence, there are numbers of behavioural change theories which have been applied to health related behaviour. Although they have not been received with unanimous support, they do assist in providing an insight into what can facilitate and what can thwart an individual to change their behaviour. These theories have influenced maternity research including those exploring areas such as breastfeeding (Stockdale et al., 2008, McMillan et al., 2009), smoking cessation (Natan et al., 2010), exercise intention (Symons-Downs and Hausenblas, 2003), accessing antenatal care (Stout, 1997), and interventions addressing gestational weight gain (Phelan et al., 2011; Gray-Donald et al., 2000). Motivation self-efficacy and regulation are regarded as central to all above discussed theories and without which behavioural change will not be possible. According to the literature, pregnancy is the time when women will have an increased motivation to make changes to their lifestyle behaviours to protect the baby from harm and to ensure that they have the best possible start to their life (Campbell et al., 2011). Health care providers, including midwives, are responsible for providing high quality antenatal care and they have to ensure that care is perfectly placed to exploit motivation and support women in making desired behavioural changes to improve their own and their baby's health.

3.4.5 Motivation

Motivation can be defined as the process by which an individual initiates, guides and maintains goal oriented behaviour (Dixon, 2008). Motivation can be seen in the daily maintenance of life such as by sleeping and eating, by individually selected hobbies and activities expected of us as members of society such as going to work and attending school.

Michie et al. (2011), state that motivation is recognised as a key for behaviour and plays a pivotal role in helping individuals to change. Motivation can be divided into two groups: intrinsic and extrinsic. Intrinsic motivation is coming from individuals as a result of interests and enjoyments guided by internal sense (Miller and Rollnick, 2009; Deci and Ryan, 2002). An example for intrinsic motivation is eating an apple by a child because she enjoys the taste not because she feels she ought to. Opposite, extrinsic motivation is guided by external means (Deci and Ryan, 2002), and motivated by a reward such as gift or money. But the line between these two categories of changing behaviours is not clear cut. For example, when someone starts going to the gym because she is extrinsically motivated to get rid of sedentary lifestyle, while in the middle of the gym activities she feels enjoyment, therefore, both intrinsic and extrinsic motivation are easily interchangeable (Stockdale et al., 2010). Motivation cannot be regarded as a static concept, but it can be modified and enhanced through an individual's sense of self-efficacy. Motivational interview theory approach is regarded as a fundamental factor for changing behaviour, in the subsection motivational interviewing will be discussed. And as this project was aimed at achieving behavioural change, motivational interview was employed in the study.

3.4.5.1 Motivational interviewing (MI); a tool for intervention

Motivational interviewing (MI) is regarded as a client-centred counselling aimed to promote behavioural change. MI can be defined as a directive and counselling style for eliciting behaviour change by helping participants to explore and resolve ambivalence (Miller and Rollnick, 2009; Hettema et al., 2005). Originally, it was used to motivate patients who abused alcohol to modify their drinking behaviours. American Congress of Obstetricians and Gynaecologists reported that by implementing MI to everyday patient's interaction has been proved in eliciting behavioural changes (ACOG, 2009). The goal of

motivational interviewing is to "help patients identify and change behaviours that place them at risk of developing health problems or that may be preventing optimal management of a chronic condition" (Bundy, 2004, p.45). Recognising the dynamics of an individual patient's readiness to change behaviour is integral to this approach (Prochaska and Velicer, 1997). The goal of using MI is to help participants to move through the stages of readiness for change in dealing with risky or unhealthy behaviour. Accordingly, the steps for changes are:

- Pre-contemplation: in this stage the clients /patient does not believe a problem exists such as "I am obese".
- Contemplation: the client recognises a problem exists and is considering behavioural change "I could be better if I change my lifestyle"
- Action: the client begins behavioural change "I will start to do some types of exercise"
- Maintenance; the client incorporates new behaviour in to daily life "I am walking for at least 30 minutes three days in a week".
- Relapse the client return to undesired behaviour "I feel tired I think I will stop for a while" (more in table 3.1)

3.4.5.2 Principles and Practice of Motivational Interviewing

Motivational interviewing (MI) helps the client to identify the feeling and thoughts that lead to the continuation of "unhealthy" behaviours and help develop new thought patterns to aid in behaviour change (Miller and Rollnick, 2010). Once the desired outcome, for instance weight loss or smoking cessation is set, the HCPs then use the following principles during the interview: since this approach is not relevant to teaching in groups,

the current researcher updated this approach and used it in group discussion. She used the following steps in her study:

- 1- Express empathy and avoid arguments: the researcher stated to the participants “I can understand that it is difficult for you as a pregnant women to control your weight gain and prevent some unhealthy food. Many other women find this challenging. But we can still find other ways to change behaviour and to have healthy lifestyle style; do you want to stay with healthy diet or physical exercise or both?”
- 2- Develop discrepancies: the educator can help the pregnant women to understand the difference between her behaviour and her goals. For example, consider stating, “You have told me that you would like to feel better and decrease the number of meals. I think you know that having healthy diet would help with this. Why do you think it is hard for you to find more time to exercise?”
- 3- Roll with resistance and provide personalised feedback. An example for this part, when the participants express reasons for not attending the sessions and not achieving the goals. The researcher helped them by finding a way to meet the goal such as “I know it’s difficult in this community to come to the sessions without barriers but when you are at home, please go through the hand-outs and watch the CD regarding physical exercise during pregnancy and walk around”.
- 4- Support self-efficacy; elicit self-motivation, For example, “the educator asked participants lets discuss around the best ways for preparing healthy food”.

Table (3.1) Motivation theory applied to the educational programme

Components	Sessions contents	Objective of the session	Techniques	Potential outcomes
Pre-contemplation	Session one; Women were provided with information about pregnancy, body changes, health during pregnancy and proper nutrition during pregnancy	Women started to believe that obesity was a problem and proper nutrition and exercise is crucial for them in this time	Teacher led activities Presentation and lecture	obesity in pregnancy is problem
Contemplation	Session two; Women were provided with common complications of obesity on mother and babies which helped them to recognize a problem and be ready for changing it.	Women started to realise that they were obese and have to start to do exercise and have healthy food during pregnancy.	Lectures and group discursion lead by facilitour Demonstration	giving tool to help them"
Action	Session three; The educator starts to demonstrate simple exercise with in the class for women and women like muscle stretching and deep breathing technique.	Women in this phase they start to do exercise and move to their self from unhealthy diet	session (1-2) Q&A	Recap of they started to action things
Maintenance	Session four; Women started to do exercise at home with her husband and children	Women began to indicate that they were walking and decreasing the amount of sugar, carbohydrate, and fat in their food. and they avoid unhealthy	Session (3-) Q&A Group discussion Getting women to talk to each other	They will start to change their behaviour

			Postnatal reunion education	
Relapse	Session five; Postnatal reunion Women were provided with skills and knowledge regarding healthy living and good body image	Women were started to feel that the sessions is not important anymore because they deliver the baby	Information given Handout Video Peer support	Postnatal Women will not relapse and will continuous to influence the diet on themselves and family

3.4.5.3 Motivational interviewing in the health care settings:

The practices of MI is emerging as an effective tool for behaviour change, and have been successfully used within the clinical setting to promote weight reduction, dietary modification, exercise, and smoking cessation, thus having a potential profound impact on heart disease, hypertension, and diabetes mellitus (Warren, 2013). The American College of Obstetricians and Gynecologists (ACOG, 2006) encourages the use of MI as one effective approach to elicit behavioural change. The use and impact of MI has been shown in literature. For example, a study by Salmela-Aro et al. (2012) suggests that the use of MI may increase the duration of breast-feeding and improve smoking cessation efforts. Some studies support the use of MI to reduce risky behaviours in individuals with HIV infection as well as improve adherence with medication regimens (Salmela-Aro et al., 2012, Velasquez et al. 2009, Naar-King et al. 2006). The use of MI has been successful in such diverse areas as reducing the fear of childbirth, as well as, decreasing the rate of caesarean delivery (Bak, 2003). As stated before, MI is applied for one to one style but not group. In fact there are many research papers available which recommended using MI in group discussion style such as a study conducted by D'Amico, Osilla and Hunter (2010) who examined how teenagers who had committed a first time alcohol, responded to MI group intervention. They concluded that utilising group MI can be an acceptable

approach for at-risk youth. While there is not much evidence about obesity there have been great successes in other areas of health promotion and behavioural changes.

Moreover, Oteng-Ntim et al. (2010) highlighted that motivation and readiness to change were regarded as a crucial part of changing behaviour which handicapped the effectiveness of interventions to tackle obesity. However, pregnancy is regarded as a time when women are more receptive and motivated to change.

Motivational interviewing techniques have been evaluated and found to be effective in randomised clinical trials. These trials have examined the impact of the use of motivational interviewing to elicit behaviour modification such as smoking cessation, human immunodeficiency virus (HIV) risk reduction, and increased diet and exercise (Browning et al., 2013). In a meta-analysis of 72 randomised clinical trials were carried out on the effectiveness of MI in eliciting behaviour change such as smoking cessation, weight loss, decreased alcohol use, and cholesterol level control. The result indicated that MI had a significant and clinically impact relevant in modifying behaviours in approximately 75% of the studies, with an approximate equal effect on those with physiologic and psychologic diseases (Golin et al., 2012). More than one encounter ensured greater effectiveness with the patient. Discussion of behavioural change to improve health outcomes is not associated with diminished patient satisfaction. In fact, tobacco use assessment and counselling by the physician are associated with greater satisfaction (ACOG, 2003). However, a USA RCT based study in 2006 by Rigotti et al. aimed to find out the effect of tailored telephone counselling on 442 pregnant smokers. The intervention used an MI style. The intervention counselling using MI did not outperform a brief “best practice” intervention among pregnant smokers and the intervention had efficacy in light smokers and in women who had attempted cessation

earlier in pregnancy. So, the current researcher used the MI principle in their educational programme as a tool to encourage women to change their behaviour to desired healthy lifestyle during their pregnancy.

Developing and implementing an effective educational programme needs many principles such as a skilled educator and a friendly environment which enhances communication and interaction between the educator and participants in the programme. Furthermore, it is crucial that the programme itself is designed in a format which is culturally accepted and fulfils the needs and requirements. In addition, the objectives of the programme should meet the needs of the participants (Cottrell et al., 2006). One of the advantages for the current researcher was her experience as a clinical instructor in maternal and child health care centre in the region. Besides, since 2011, the researcher has attended many antenatal educational sessions in England which were delivered by the Local NHS Trust for obese pregnant women and other antenatal education programmes, provided by Birmingham City Council. This has been found helpful by the researcher in designing the educational programme and applying suitable teaching strategies. In the next section, the researcher tries to present the different teaching style and strategies, benefits and barriers for antenatal classes.

3.4.6 Teaching strategies in maternity services

Teaching strategies can be defined as an environment which fosters a culture based on the personal and the group, growth, developments, flexibility and trust, in addition to including the arrangements of chairs and removing perceived barriers to participation Nolan (1998).

An important issue during antenatal education which the educator has to consider during designing teaching strategies is the size of the group of women in antenatal education. Ho

and Holroyd (2002) identified group size as a theme in their study which helps women to have the chance to address their personal problems and make friends. The authors concluded that “small informal classes using role-play, problem-solving activities and experience-sharing sessions would promote interaction” (p. 83). So their conclusion will support adult education literature. In Daines et al. (1993) work entitled “Adult Learning”, the author reported that most adult classes compromise 12-20 adults to allow people to learn from each other and share their experiences. Meeting pregnant women from different backgrounds, obstetric history and experiences, will provide women the opportunity to learn from each other. In addition, Nolan (2009) suggested that women can learn from others’ experiences when they come from different gravidity. Based on this research, the inclusion was to include all healthy women who are in their first trimester including primigravida and multigravida, so that women are encouraged to share their experiences and to enable new mothers benefit from other women who are experienced. Another issue which might arise during antenatal educational is information overload. As reported in several studies, women could not remember all information during pregnancy because they received too much information in too short a time (Ho and Holroyd, 2002). Women preferred to have time for discussion with their parents and peers to get to know about their experience. A study by Spiby et al. (1999) reported that women were dissatisfied with the antenatal education during which they received regarding coping strategies for labour. The reasons for not utilising the strategies during labour were returned due to limited available practicing time. Current educator tried to provide the public messages regarding healthy life style by also including a CD about exercise and leaflets in order to provide women with a variety of teaching strategies so to avoid information overload.

An investigation by Ho and Holroyd's (2002), reported that pregnant women were more likely to participate in the group discussion during pregnancy in order to have a chance of exchanging information and talk. In literature, group discussion was described as a suitable strategy for educating women during pregnancy because of the following advantages: Baldwin (2006) suggested that using group discussion as a teaching strategy during antenatal educational programme, provides women with a platform for social support due to similar condition and experiences which is pregnancy. Additionally, the researcher points out that this social support during antenatal group discussion is seen as crucial among pregnant women. Another advantage of group discussions during educational programme was also mentioned by Williams and Booth (1985), where the literature indicated that group discussions are much more active and participants are encouraged to express their thoughts, unlike other teaching methods such as lectures which is more passive and much more like listening to a talk. So, the current educator tried to use small group discussions in order to provide Kurdish women with a platform for sharing their experiences after which they would get to evaluate the teaching strategies. This will indicate whether the teaching strategy was successful with respect to the aim of educating the women and also improving their pregnancy outcomes.

Regarding the way how the teaching was delivered, Nolan (2009) suggested that transforming information through using resources such as DVDs and leaflets, is cheaper than resorting to the health care provider's time (Mary and Nolan, 2009). On the contrary, according to Risica and Phipps (2006), who conducted a study in USA, concluded that study participants preferred receiving information regarding pregnancy in face to face way, rather than over other resources. This result is in concord with that of Stapletons et al. (2002). Stapleton et al stated that despite the immense effort that had been put into

producing the leaflets, women preferred to discuss the contents of leaflet with their midwives. The current researcher used group discussion and provided enough time for women to ask the facilitator or the co-participants questions.

3.4.7 Benefits of antenatal classes

Antenatal classes are a great way to help women learn more about pregnancy, labour and postpartum care for them and their babies. They also may provide answers to any additional questions on their side and give the opportunity to share any concerns (Walker and Worrell, 2008). One of the most obvious advantages of attending antenatal appointments is to meet and chat with women and their partners who are in a similar situation. Antenatal classes are designed to be fun and can be a source of great support and confidence, especially for first time parents, who may be feeling very scared by the prospect of soon having a baby. Antenatal classes are described as opportunities for women to meet other pregnant women who have the same experiences and keeping in touch till they deliver their babies. For women who live in isolated areas far from their family and friends' support, antenatal classes are regarded as a great source for information and support during child caring. Antenatal education classes are not new because they have been provided for pregnant women for more than 50 years. Education was prepared by midwives for women about natural childbirth and then it progressed by including healthy lifestyle, anxiety reduction, stress management, enhancement of family relationships, successful infant feeding, and advice on family planning and postpartum care (Olander et al., 2015; Walker and Worrell, 2008).

Antenatal education

However, as stated before, in Kurdistan, antenatal classes are in infancy stage and women receive education haphazardly from different sources: friends, relatives, family and some

time from health care providers. Although, there are antenatal care in Kurdistan, as mentioned in previous sections, pregnant women are not provided with antenatal education classes in most cases. Thus, there are no known designed antenatal classes aimed to educate pregnant women, as such providing an environment to share their experiences, with the ultimate goal of impacting positively on pregnancy outcome emotionally and physically.

Advantages of antenatal classes in group discussion style are that they may encourage women to actively participate. In addition, participants in the class share common reasons for attendance resulting in a more efficient use of time, and can provide more time to discuss the topic because of time availability unlike the traditional type (one-to-one education). In one-to-one education, the educator feels pressured because of the number of participating women and limited time slots available to each participant which could result in shorter appointment and longer waiting time, which can be discouraging to participants (Bronson, 2005). The common topics offered in group discussion style resemble the topics in one-to-one sessions with a midwife, took 90 minutes instead of 10-15 minutes. In group discussion style, result in between and healthy refreshment are available for participants. Usually, nurses and midwives lead the group discussion style with the help of a facilitator to direct the flow of the discussions. The common educational elements in group discussion are hand-outs, videos, and worksheets which facilitate the discussion. In group discussion, women learnt how to adjust their activities to decrease their chance to adverse pregnancy outcomes (such as prematurity, developing GDM and congenital abnormalities). For example, rising (1998) stated that in group discussion women learnt how to give up smoking, have healthy food intake, normal and healthy weight gain during pregnancy. He stated that all above mentioned activities can be

positively influenced by group discussion. Rising (1998) further reports the benefit of group discussion is not just about the topics which were discussed, but also about the feeling of participants which empowered and motivated them to take an active role in their health care, feel confident and comfort during asking questions since they are participating with others who are in a similar situation like them. Furthermore, Baldwin (2006) who tested the efficacy of group discussion on women health outcomes, suggested that women preferably received prenatal education in groups. Evidence has reported the same findings. In a prospective cohort study, Ickovics et al. (2003) examined the impact of group discussion compared to individual prenatal care on birth weight of infants and gestational age at birth. Pregnant participants ($N = 458$) were of low socio-economic status and predominantly of black or Hispanic ethnic background. Birth weight was higher for infants of women receiving prenatal group classes compared to individual prenatal care ($p < .01$) due to an increased gestational age at birth. Additionally, if the infant was born preterm to a woman who was in a group that received prenatal care, the new-born was also heavier (Ickovics et al., 2003). Moreover, in a 5-year, randomised controlled trial within the same population ($N = 1,047$), funded by the National Institutes of Health, Ickovics et al. (2007) reported that women attending group prenatal care sessions were significantly less likely to have preterm birth and they were more likely to have better prenatal knowledge, more ready and prepared for labour, higher level of satisfaction with their care and higher breastfeeding initiation rates. These are similar with the findings by Grady and Bloom (2004) from a study conducted in the United States (US) on 124 adolescent pregnant women. The researchers found that women in group discussion were less likely to have preterm babies compared to women who participated

in individual format. Therefore, according to the above research findings, women in group discussion style showed higher rate of knowledge than individual care style.

The Cochrane Database Review (Gagnon, 2000) examined the literature on individual or group antenatal education for childbirth/parenthood. The review included results from six randomised controlled trials ($N = 1,443$) of structured educational programmes provided during pregnancy by an educator that included information related to parenthood, pregnancy and birth. Whereas, cessation of smoking and increased breastfeeding were excluded as they were reviewed by other Cochrane Library reviews. Although, the author acknowledged that a great deal of variation exists in the prenatal education programme literature, ranging from individual to group offerings, which must be taken into consideration. The conclusion of the Cochrane Database Review was “*that individualized prenatal education directed toward avoidance of a caesarean birth does not increase the rate of vaginal birth after caesarean section, and that the effects of antenatal education for childbirth and/or parenthood remain unclear*” (Gagnon, 2000).

Another Cochrane Database Review (Gagnon and Sandall, 2007), which included nine trials (2284) women, aimed was to assess the effects of individual and group education on knowledge acquisition, anxiety, sense of control, pain, labour and birth support, breastfeeding, infant-care abilities, and psychological and social adjustment. From this review, Gagnon and Sandall (2007) concluded that “the effects of general antenatal education for childbirth or parenthood, or both, remain largely unknown. Individualized prenatal education directed toward avoidance of a repeat caesarean birth does not increase the rate of vaginal birth after caesarean section”.

Nolan (2009) on the other hand encourage educators to empower women to change their behaviour toward healthy lifestyle during their educational programme in order to

decrease women's chance to adverse pregnancy outcomes such as maternal, labour and neonatal adverse outcomes (GDM, PIH, prolonged labour, prematurity, and congenital abnormalities) (Nolan, 2009). Motivational interviewing is regarded as an effective tool for intervention during pregnancy and was also used by current educator during educational programme.

However, to make more extensive health to promote changes to behaviour, requires women to believe that not only should they improve their diet and physical activity, but that they are capable of changing and maintaining those healthy behaviours. From the literature, it is evident that in the absence of clinical guidelines, there is limited information on current clinical practice regarding the management of gestational weight gain. Little is known about how pregnant women in the Kurdistan region feel about their weight gain management during pregnancy, and what would be the most appropriate methods to support them to maintain a healthy diet and appropriate physical activity levels. This research project seeks to address this gap in knowledge.

3.4.8 The educational programme of this study

After extensive literature review the researcher developed an educational programme for obese pregnant women in Kurdistan region of Iraq.

3.4.8.1 Programme Description

The innovation was to use an antenatal group model to deliver interventions to promote healthy living and minimum weight gain during pregnancy. The six-week programme addressed a gap in service provision for women who were vulnerable and unlikely to access services for help. The women were identified by researcher with the help of health care providers in the centre who could refer women onto the programme. The

key features of the programme were on healthy living, choosing healthy foods, how to prepare for the birth, pregnancy-suited exercise and taking care of yourself;

3.4.8.2 The main objectives of the programme were the following:

- To help women stay healthy during the pregnancy and highlight the importance of not gaining too much weight during the pregnancy.
- To help women to understand what makes them choose the foods they eat and how to change their lifestyle to healthier habits.
- To increase women confidence and self-esteem.
- To help women improve their knowledge about the importance of a balanced diet and consequentially enhanced cognitive functions.
- To enable women to build up networks and new friends and have the confidence to change their eating habits and increase exercise.

Initially, the educational programme ran for one and a half hours per week for the duration of six weeks. However, in response to participants' feedback that the sessions were too long, sessions were shorted to 45 minutes. Obese pregnant women in the intervention group were invited to these programme sessions commencing immediately to see how this would affect their pregnancy outcomes.

3.4.8.3 Developments of the educational programme

1. The educational programme was developed according to the following steps: All topics were selected after extensive literature research on obesity and educational programmes for pregnant women. Studies around obesity and educational programmes were accessed in different areas in the UK, to ensure the applicability and relevance of the available programmes within the UK. The scope of this research was to take the UK educational programmes as a point of departure and to modify them to make them adequate and applicable to Iraq/Kurdistan.

2. At first, the researcher produced the first draft of the programme. Next, with the help of her supervisor(s), she was introduced to a leader of a similar education programme in a local NHS trust in the UK, who was happy to share her programme design and content with the researcher. The researcher consequently attended some of these sessions to become familiar with the programme, regarding the environment in which it was conducted, the style used by the educator and the content of the programme.
3. The researcher used the UK-based educational programme as a model with some modifications of the contents and teaching environment (see appendix 3.1 for UK based educational programme).
4. Finally, the researcher adapted the programme that was implemented in UK to make it appropriate for the Kurdish context and cultures. As a consequence, certain elements, such as Aqua natal, were excluded (see appendix-3.1).

3.4.8.4 Contents of the educational programme

UK educational programme was used as a basis and adapted to the Kurdistan culture in the following ways:

Firstly, the researcher left out those topics which were culturally and socially not accepted in Kurdish context such as aqua natal. This also meant excluding some topics which are not practised in Kurdistan or unavailable such as nutrition label (which help people to choose between products and keep a check on the amount of ingredients that are high in salt, sugar and fat)

The educational programme included the following topics as recommended in the literature (Campbell et al., 2011):

- First session: General knowledge regarding pregnancy, body changes and minor discomfort during pregnancy. In addition, proper nutrition during pregnancy such as eating vitamin-rich, fresh food, and avoiding salt, fats and sugar
- Session two: obesity and pregnancy, complication experienced by the mother and babies as a result of maternal obesity, BMI, recommended weight gain during pregnancy, and foods to avoid during pregnancy.
- Session three: exercise during pregnancy (doing exercise with participant class based exercise)
- Session four: labour, its stages and what happened in each stage
- Session five: coping with beginning of labour at home
- Session six: (postnatal session): Feeling healthier after birth.

3.4.8.5 Style of educational delivery

The educational sessions were interactive and group discussion strategies were used as a teaching strategy in the beginning of the sessions. Baldwin (2006) suggested that using group discussion as a teaching strategy during antenatal educational programme provides women with a platform for social support due to similar conditions and experiences. The educational materials which were used by the researcher during the sessions were varied, and were carefully chosen after consultation with the supervisors and local advisor, and after attending the UK education programme.

Educational materials included the following:

- Lecture hall including chairs, a white board and a flip board.

- Laptop and power point presentations (showing some simple exercise video for obese pregnant women and yoga during pregnancy).
- CDs, hand-outs, pamphlets, written instructions and videotapes on minor discomfort during pregnancy, pregnancy and nutrition, obesity and its effect on pregnancy outcomes, and exercising during pregnancy.

3.4.8.6 Preparation for educational programme sessions

In addition to HCPs' help, the researcher received help from administrative staff at antenatal unit in Kurdistan to book a lecture room at the day of a planned session. It was the researcher's responsibility to clean and prepare the room and provide water and refreshments for the participants. Additionally, the researcher sought assistance from two midwives in the areas. They assisted the researcher during the educational programmes by distributing educational materials like papers and CDs among the participants. All women who participated at each educational session were registered. Registration commenced five minutes prior to the beginning of each session, The attendance was recorded by an attendance register and attendance calculated on the number of sessions each women attended.

3.4.8.7 Language used during educational programme

At the start of data collection at the end of 2012, majority of the population receiving health care services in the collaborating antenatal centres could speak Kurdish. Kurdish consists of two main dialects, each dialect having further regional sub-dialects (Hassanpour, 2001). The researcher has sufficient command of these dialects which enabled her to include participants with different dialect backgrounds into the programmes. However, during data collection process, non-Kurdish speakers started to seek the services of the respective antenatal centres, as the war in Syria brought many

refugees and migrants to Kurdistan. As the educational programme was designed to include group discussion, and the researcher attempted to enhance a proper women's communication with each other, speakers of other languages, such as Arabic and Turkish, were not included. The researcher can understand and speak both languages but because it was not possible to guarantee that the other women in the sessions could understand these languages and the education sessions, the researcher decided to include only those who understand and had proficient communication skills in Kurdish.

3.4.8.8 Evaluation of the benefit of the educational programme:

Women who attended the educational programme (intervention group) were invited to:

- Participate in a programme evaluation at the end of the 5th session of the programme for completion of Likert type scale.
- During the sixth session which was after delivery of the baby (2-8weeks after delivery), the researcher asked the women to attend a postnatal reunion and stay to participate in a focus group discussion relating to their experience of the intervention. Women were aware of the time because they were informed by researcher over the phone. Participants in the focus group part of the event were invited to explore their experience of the programme and its benefits/ limitations in terms of pregnancy outcomes.

3.5 Part four

3.5.1 Data collection methods

This describes the methods applied during data collection. In order to find answers for quantitative strand, the researcher used questionnaires. Focus group discussions were used them for qualitative strand.

3.5.1. Pre and Post- study Questionnaire (Quantitative data).

Questionnaires comprise a set of questions to collect data from individuals regarding their habit, attitude and socio-economic characteristics. The different types include the closed-ended questionnaire and the open-end questionnaire (Radhakrishna, 2007). In the current study, the researcher used closed-ended questionnaires on two occasions (see appendices 3.2 and 3.3). There are many advantages and disadvantages for using questionnaires. According to Wakley (2015), using questionnaires helps the researcher to collect a big sample in a short duration of time. In addition, data collection through questionnaires can easily be entered into statistical software packages (like SPSS) and analysed by using the same tabulation in package. Wakley (2015) also identified that using a questionnaire in research will reduce the personal bias of the researcher during data collection, unlike when conducting face-to-face interviews. Despite many advantages of questionnaires, there are disadvantages as well, such as some questions might not be understood by participants. In this type of questionnaire, there is no additional space to write individual comments (Wakley, 2015). To overcome this problem, the researcher was present during data collection and the participants were able to ask her to clarify some of the questions. Furthermore, some open-ended questions were added to help participants to attach further comments. Another disadvantage of questionnaires is that the response rate is often low (Bowling, 2009). Availability of researcher at the time of completing questionnaire by participants helped to overcome this issue. Then the researcher checked the entire questionnaire to see what was missed when it was being filled in. Whereas, according to Marshall (2016), a common disadvantage of the researcher being present during interviews is that it creates room for biased responses which is regarded as one of the limitations of the current study.

Development of the questionnaire

Radhakrishna (2007), stressed that development of a questionnaire is pivotal to reducing measurement errors in the questionnaire content, design and format. Diem (2004) identifies several steps for those researchers who want to develop a valid and reliable questionnaire format in educational and evaluation research. The researcher must at a minimum follow these steps to enhance the quality of research. Firstly, the essential step of questionnaire development is to examine the research aims, objectives, questions, and hypothesis. Understanding the problem through extensive literature review regarding the topic is essential in this step and it will guide the following step. In the next step, statements/questions for the questionnaire are generated. Literature is transformed to questions and statements. Thirdly, it is important that the questions are formatted and selected for an appropriate scale of measurements, with a suitable questionnaire layout, format, question ordering, font size, and proposed data analysis. Fourthly, the questionnaire needs to be checked for validity by checking with a panel of experts. Finally, reliability can be established by conducting pilot test and checking whether the questionnaire consistently measures whatever it measures. In the current research, the first (pre- study) and second (post-study) questionnaire were developed according to the following steps: at first, an in-depth literature research about obesity and its effects on pregnant women was conducted. This was complemented by formal discussions with lecturers and local advisor at Nursing and Midwifery department in Hawler Medical University in Kurdistan region as well as formal discussions with supervisors at De Montfort University. The validity of the questionnaires will be further explored in the discussion chapter.

The final questionnaire included many variables to be answered by either filling in number(s) or word(s). The majority consisted of multiple choice questions, which were easy to fill in. The variables included demographic data of pregnant women such as age, level of education, address, obstetrical and gynaecological history.

The questionnaire has been completed by both two groups providing quantitative data for analysis. The researcher asked participants to complete the questionnaire before commencing the educational programme, and if not afterwards. The aim of the first questionnaire was to capture data at a pregnant woman's initial visit to the health care centre before the 20th week of gestation. The second instruments comprised the following: women's health status before labour, BMI, gestational weeks, mode of delivery, duration of labour, health of baby, Apgar score, admitting to NICU, weight of the baby etc. The questionnaires were completed for both groups, providing quantitative data for analysis. These were second set completed by the researcher. The researcher contacted pregnant women after she had been informed by the pregnant women or their relatives that the labour had started, (She had asked the relatives to give the information to health care providers in labour theatre or by labour attendance for those who conducted their labour with private midwives). The questionnaire was completed within 24 hours of when the women started the labour because the questions were more about mode of delivery, baby and mothers health status. The aim of the questionnaire was to capture data relating to pregnancy and birth outcomes for mother and baby following childbirth. The researcher as a data collector completed Post-study questionnaire over the phone.

After developing of questionnaire, the researcher translated it to the local languages (Kurdish) then sent these to an interpreter, who was fluent in English and Kurdish languages for cross-checking to ensure that it was done with precision.

Challenges with data collection methods

There were many challenges that arose during data collection. The first challenge concerned the pre-study questionnaire, which was to be completed at the first session of the educational programme. This pre-study questionnaire included some measurement variables such as height, weight and BMI. For illiterate women who were not accompanied by an educated relative, the researcher provided assistance, helping them in filling the questionnaire and assessing women's height and weight and capturing this on their questionnaires. Challenges arose also with the post-study questionnaire which aimed to collect data about pregnancy outcomes and BMI before delivery, the status of the new born, and the Apgar score. The researcher collected the information by herself over the phone when she faced barriers which prevented her from attending the delivery. When women gave birth at night, the researcher was not able to complete the questionnaire because in Kurdish culture, women are not allowed to go to work at night alone (conducting data collection at night). In other situations, women gave birth during a session of the educational programme with different participants and the researcher could not leave the educational programme to attend to the woman who was giving birth. The researcher's own family commitment was another barrier. For above mentioned reasons, the researcher notified the participating women to be aware that she is going to call them when their delivery is close. However, improper patient records at hospitals and the lack of suitable file system, meant that the researcher had to draw up her own schedule for both groups of women of the study so that she knew when their babies were due. She rang the participant to check if her labour had started and asked her to give such information through the phone interview. In cases where women were unable because of birth pain, their relatives answered the phone. The common questions asked over phone concerned

women's weight prior to delivery and when the labour started (to check for duration of labour). In situations where women could not provide the answer to objective questions, the researcher obtained these answers from health care professionals who attended the birth.

3.5.2 Likert- type scale (quantitative data)

As stated by Bertram (2007) Likert scale can be used to obtain participant's degree of satisfaction and preferences with a set of statements. In this study, Likert type scale questionnaire, is one which the scale does have an ordered continuum of response categories and a balanced number of positive and negative options. This questionnaire was distributed to all women in the intervention group at the end of the educational programme at the last session during pregnancy. The aim for this questionnaire was to collect quantitative data on the women's self-evaluation to the healthy educational programme and its relevance to the needs of pregnant, obese women.

This questionnaire was already validated for use in UK and was provided by an NHS Trust which used the same questionnaire in the UK. The sections included questions regarding women's view about the educational programme. Participants could rank the programme by circling the representing figure from one to ten. At the end they were invited to write their comments on the programme. Here, the response rate was good because they completed it at the end of the 5th session of the educational programme and it was quite easy for the women to fill.

3.5.3 Focus group (qualitative data)

Focus groups involve participants in in-depth discussion about selected topics (Rabiee, 2004). Sampling in focus groups was mostly done purposively because the researchers needed to know views about specific phenomenon of those concerned (Rabiee, 2004). In

the second arm of the current study, the researcher chose the focus group as a method for collecting qualitative data from women who were participating in the programme.

3.5.3.1 Why focus group

As Krueger and Casey (2014) state, the most useful method to understand individuals' feelings and opinions in a short time is by a focus group. Morgan (1996) identified that one of the advantages of focus groups is the group dynamics and the opportunity for the researcher to collect a wide range and different types of data. The social interaction of the group is deep and produces rich data. This helped the researcher of the current study to explore different views of participants in different socio-economic settings within different societies and with different cultural status about obesity, and its effect on pregnancy outcomes. In addition, this approach was chosen to explore women's perceptions and any benefits to pregnancy outcomes. However, Krueger and Casey (2000) point out that while self-disclosure is normal and natural for some individuals, it requires more trust for others. In this research, the researcher started the focus group sessions with informal talk to make the participants feel free and comfortable and named all women to help them engage in group discussion. The participation criterion in the focus group was having delivered the baby and having attended the educational sessions before birth.

3.5.3.2 Women as homogenous within focus group

Krueger and Casey (2014) stated that rich data is obtained from focus groups if all participants engage in discussion and feel comfortable in doing so. Hence, sharing some characteristics such as gender, socio-economic status, ethnic background and age range within the group, make the participants feel comfortable. -In the starting of focus group,

the researcher planned to invite all women in different health centres post-delivery to attend focus group but because of cost and time it was not convenient for all women to attend together at the same time. In addition, the different socio- economic and educational levels would have stratified the group further. The researcher was concerned that this might have inhibited the participants to express their views, feelings and opinions honestly and openly (Krueger, 1994). She invited women from the same health centre without considering their socio-demographic backgrounds such as level of education, economic status and occupation.

3.5.3.3 Planning of the focus groups

Focus groups were planned based on research aims. The first step which the researcher planned before conducting focus group was to decide the number of women to be invited to the study and how the questions are developed. Krueger (1994) stated that the number of participants to attend focus group is the most important unit during analysing focus groups. In the beginning, the researcher planned to conduct focus groups to include all women who received the educational programme to explore their experiences regarding the educational programme and their perception benefits and limitation to their pregnancy outcomes.

Regarding the size of the focus group the researcher called 10-15 women who delivered their baby and were within 2-6 weeks of their postpartum period to attend focus group. The focus group had an average turn-up of four to five women. However, it was common

that one or two women left prior to finishing the session, and often the remaining participants asked the researcher to finish soon because they equally had to go soon because they had left their small babies in relatives' care and wanted to breastfeed. According to Krueger and Casey (2014), the group size should be not too small in order to have chance to obtain variety of ideas and opinions, and not too big to lose control and give chance for all to participate. After discussing and debating regarding the group size with supervisors, the researcher decided to invite as many as she could to increase the chance for getting more women to the focus group discussion. There is argument about normal size of focus group in the literature. Some schools of thought prefer up to sixteen, whereas some regard a useful size as small as four (Kitzinger, 1995; MacIntosh, 1993). Then the researcher called all women who had delivered their babies and were within (2-6 weeks) in their postpartum period to attend. By this the number of women attending increased to 5-6 women. Based on my experiences as a facilitator of the group discussions in the current study, the group size from seven to ten was a perfect size for the focus group discussion with the mothers to allow them to tell their story and discuss with each other. This is supported by Smith (2007) who recommended that in social science studies, six to nine participants is a good size for a focus group in order to allow all participants attend the discussion,—Regarding qualitative question during focus group, the qualitative questions are not like quantitative side which deal with large sample and generalise to a large population. In the contrary, qualitative questions were used to explore women's feelings and experiences about the programme. Therefore preparing proper prompt questions for the focus group was very important. The researcher developed some topic guides for the focus group and used the same format in all focus groups which she

conducted. Ritchie et al. (2013) stated that topic guides, also known as interview guides, list the most important themes to be explored in the qualitative research interaction.

3.5.3.4 Setting of conducting focus groups

The location for conducting focus group had been booked in advance by the researcher with the help of HCPs on the same day as the sixth session of the educational programme. After the sixth and final session of the education programme was completed, the researcher called for a small break of five minutes, after which she started to conduct the focus group. At the beginning of the research, the researcher had planned to put the focus group discussion on a different day, but after a discussion with the women, they showed their interest and readiness to attend the focus group discussion on the same days of the last educational programme (sixth session postnatal). They argued that they would not be attending sessions anymore because of their responsibility at home of looking after a new baby.

3.5.3.5 Equipment using in focus groups

The focus group conversations were recorded using a digital recorder (MP3 player) after getting consent and approval from the participants. The recorded audio files were then downloaded to researcher's laptop. Information sheet had been given to participants before the start of the educational programme and repeated by researcher verbally during the focus group session. Informed consents had been given by participated women on the day of the six educational sessions which was held on the same days of conducting focus group discussion postnatal.

3.5.3.6 Conducting the focus group

Recruitment began by registering participants. The researcher began to record the discussion following the participant's permission to do so. The discussions began with greetings and some informal talk regarding their babies' health and new family. This was done in order to make the participants feel comfortable and to increase the productivity of the discussion. The first focus group served as a pilot trial (see pilot focus group section) for other focus group discussions. Smith (2007) and Krueger (1994) suggested that using direct, right, comfort and simple questions during focus groups discussions, will help the researcher to produce productive focus groups. She developed a topic guide (see appendix- 3.4-). This involved the following steps: an extensive literature review about educational programmes and their evaluation, and about obesity and pregnancy outcomes, extensive discussion between researcher and her supervisors. The important themes which were discussed in the focus group were reflections on the education programme. Participants reflected on which elements were enjoyable and which least enjoyable of the programme, what were the key messages from the programme and feedback on the organisation of the intervention programme, including timing, place, and venue of the classes.

3.5.3.7 Focus group and Data saturation

Parahoo (2014) stated that data saturation occurs when no newer themes emerge. In this study, the researcher had planned to stop the data collection if there was a repetition in the information. However, there was no such saturation of data. The reasons for not getting data saturation is because the attendance rate of focus group was low and each participant stated different socio-cultural barriers for not attending the discussion.

3.5.3.8 Challenges which arose during focus groups

- Attendance rate was poor because women had new-borns and they were not able to come to session (the researcher asked the women to bring their children, but they were not allowed by their respect families to come with their babies to a hospital environment).
- Many had caesarean section and were unable to attend focus groups.
- Many women rested in the mornings when the focus group was scheduled, as they spent their night time with the small babies. So they could not attend the morning sessions. The researcher tried to move the time of focus group from 9 am to 9:30am but not later because most of the women wanted to be at home before 11 am to prepare lunch for their respective families. Some of them attended focus group, but they stayed for 10-20 minutes. They were in a hurry to go back home, because of the responsibilities they had for their small babies and families.

3.5.4 Field note (qualitative data).

Field notes are intended to be read by the researcher as evidence to produce meaning and an understanding of the culture, social situation, or phenomenon being studied. The notes may constitute the whole data collected for a research study such as observational study, or contribute to it, such as when field notes supplement conventional interview data (Labaree, 2009).

The current researcher kept a diary during data collection phases to note observations and insights from women toward the educational programme, topics under discussion, researcher style and position, and classroom atmosphere. Also, as some of the participants met with HCPs during their antenatal visit, the researcher sought for the views of the HCPs regarding their daily interactions with the participants in order to get some additional information. For example, the researcher sought to know if the HCPs were aware of any reasons as to why some of the participants did not show up for the

educational programme. Reasons that were mentioned by the HCPs for not attending the sessions include: cultural and societal views toward obesity, family barriers and timing of the sessions. This information was obtained through informal talks before and after sessions, and discussions between HCP, researcher and physicians. Furthermore, after each session the researcher wrote remarks about the classroom atmosphere and discussion points. Moreover, the researcher wrote her reflections on the points under discussion after running each session.

3.5.5 Telephone interviews

Irvine, Drew, and Sainsbury (2013) stated that phone interviews offers a range of significant advantage for qualitative researcher such as, time, cost and response rate. Phone interviews also allows participants to remain anonymous. In this study,, while the researcher rang participants inviting them to the focus group, some of them brought excuses for not attending. So, the researcher tried to ask them some questions regarding their experiences to the educational programme and their perceived benefits to the pregnancy outcomes.

After they delivered their babies, the women were asked the following questions in a telephone interview:

- Have you delivered your baby?
- Are you coming to the postnatal reunion?
- What are the reasons for not joining to the reunion?

3.5.6 Pilot study

Piloting questionnaires

Thompson et al. (2008) stated that the study questions must be clear to participants and the researcher must ensure that the manner of interpretation is the same for all

participants. The pilot study for this study was conducted for pre-study, post-study and Likert Scale questionnaires. It was conducted in health centres with a number of women. The criteria of the pilot sample were similar to the population of the study. In other words, the inclusion criteria of the women in the pilot project was similar to the population. The aims for conducting the pilot study was to determine whether the questions were clear, easy to understand, time needed to answer each questions and relevant to the participants and how the participants dealt with research in general. This pilot study was conducted to find out the difficulties faced in analysis and to see if any changes were necessary. The pilot study ran smoothly, but there were some minor modifications made, like clarification of some questions. There was enough time to answer the questions and the participants showed an interest in the research topic. The questionnaires were then sent to chosen lecturers at Hawler Medical University/Nursing College and health care providers at one Health centre before starting the actual data collection. Additional changes were made to the questionnaire as suggested.

Piloting focus group

Regarding piloting focus groups, Krueger (1994), recognises that piloting focus groups is different from piloting other types of research instruments. Piloting focus group includes elements like: the nature of questions asked, characteristics of the participants and moderator procedures. Following Krueger's advice, the researcher invited a HCP to attend the first session of focus group and the feedback from this session was incorporated into the research design.

3.5.2 Data collection process

Before starting the data collection process, all questionnaires, educational schedules and pamphlets were translated to Kurdish languages.

3.5.2.1 Recruitment process in selected health care centres

The selected health centres (A, B, and C) reserve a day in the week to register new pregnant women. Women who have just discovered that they are pregnant, have to visit a health centre immediately, but they are seen for the first consultation on another day. Hence, the researcher visited different health centres on the respective days when new mothers came to register, in order to invite the arriving women to participate in the study. The major study was conducted between November 2012 and January 2014. Ethical approval for the study was given by the ethics committee of the Faculty of Health and Life sciences at De Montfort University and Hawler Medical University, (which included access to all participating hospitals appendix- 3.5, 3.6 & 3.7).

3.5.2.2 Recruitment of the participants to the study (all groups)

Initially, the researcher worked together with the HCP to introduce women to the study. The potential participants were informed about the researcher's name, job title, title of study and aims of the study. Then those who were interested were invited by the researcher to participate in the study. The researcher gave each woman an information sheet according to their BMI groups (appendixes-3.8) and sought for their informed consent. Illiterate women, as well as those struggling to read the information sheet, were assisted by the HCP who then gave verbal consent and left their telephone numbers to the researcher. See the diagram for more information.

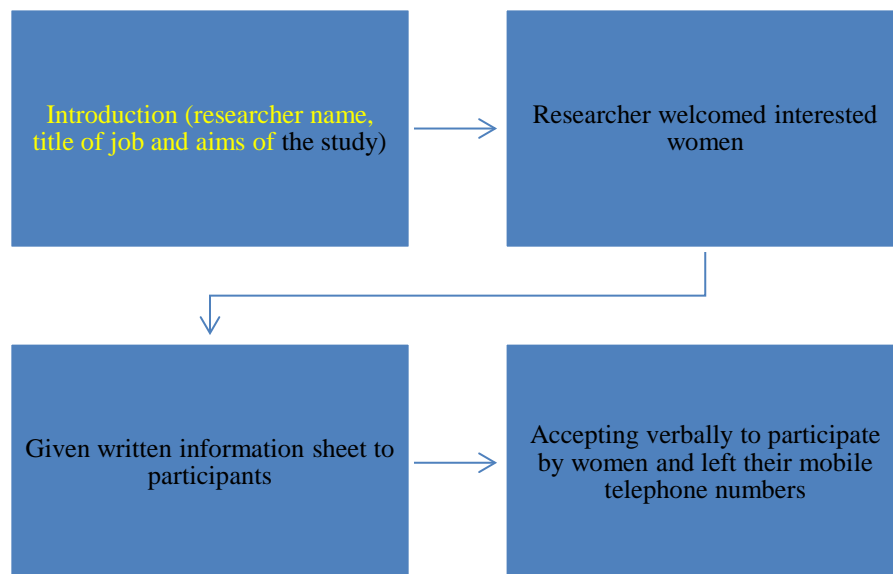


Diagram3.3 recruitment of the groups of the study

Informed consent (all groups)

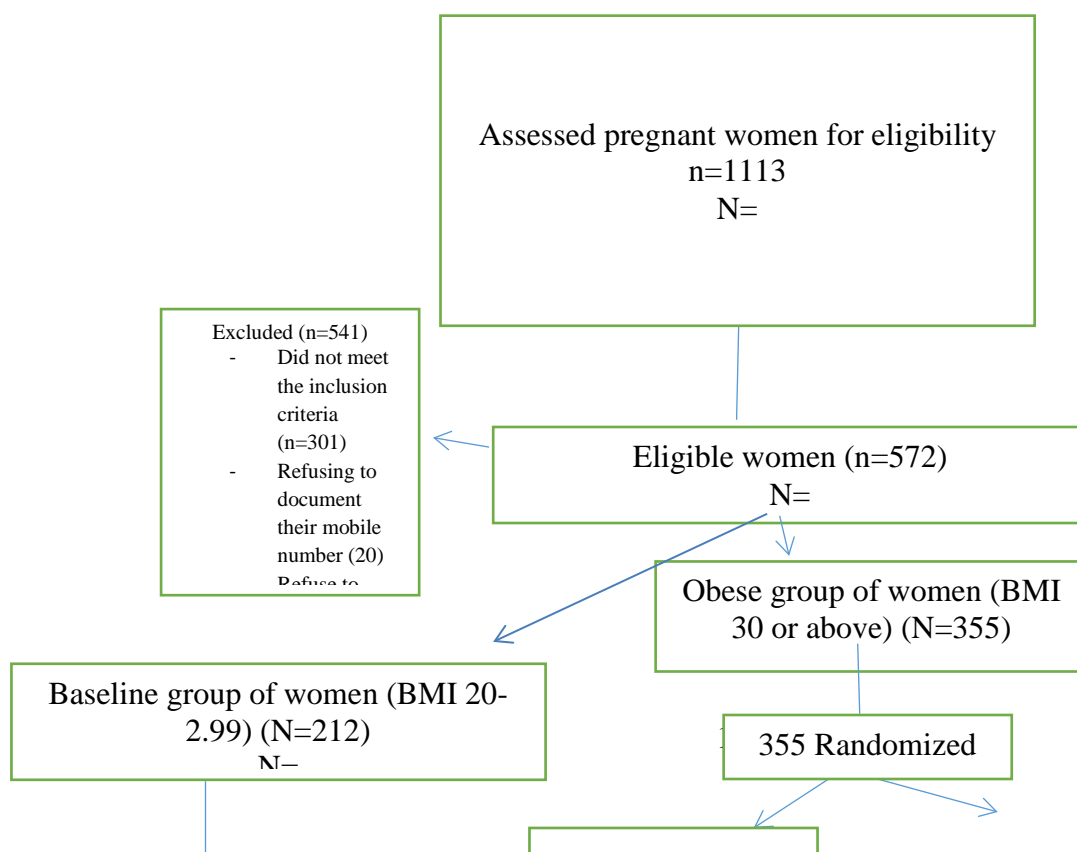
After reading the information sheet, most women got interested in participating in the study and signed the consent form (see Appendixe-3.9). The few illiterate women among the participants, signed with a finger print. Then data collection started. For more information (see the following diagram).

1113 women registered for antenatal care during the study period in the selected health centre. Women who met the entry criteria (n=572) were invited to participate in the study. Written informed consent was obtained from all women who agreed to participate. 572 women were eligible to be included in the study. 212 were of normal weight (BMI 18.5-24.99) and 99 (47%) of these participated in the study. Normal weight women received routine antenatal care see Diagram (3.4),

Three hundred and fifty five (355) women were classified as obese (women with a BMI 30 or above). These women were assigned at random to one of the two groups. One hundred and seventy two (172) obese women were allocated to routine antenatal care (the

control group) while 183 women were allocated to receive routine antenatal care plus an antenatal education programme. The antenatal programme included six 45-minute-sessions (five delivered during pregnancy and one during the postpartum period).

Not all women agreed to participate. They dropped out during the programme, which left 98 (56.9%) women in the control group and 96 (52.4%) women in the intervention group and (99%) baseline group. See diagram 3.4



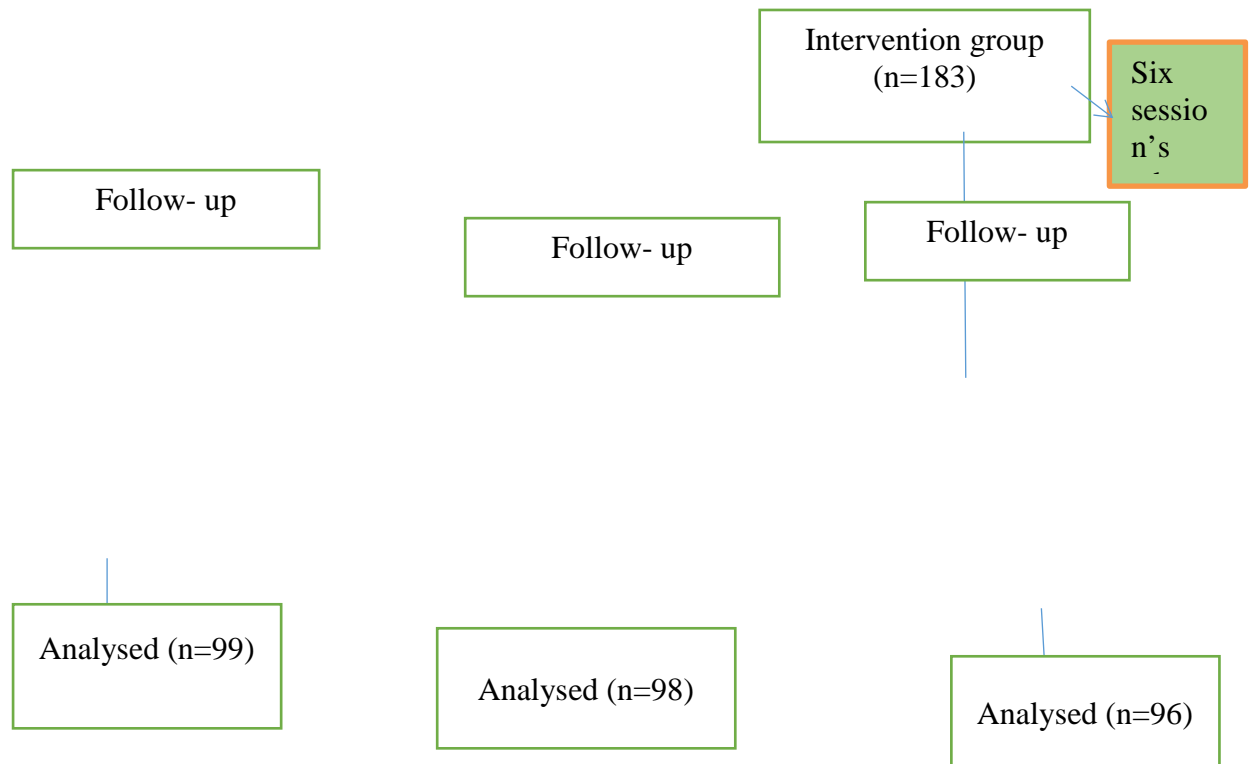


Diagram (3.4) data collection process and women eligibility to the study

3.5.2.3 Data collecting (Baseline and control groups)

After informed consent was obtained, the researcher started to collect data. Data collection from the baseline group has been pursued with the help of two questionnaires at two consequent occasions

- 1- Gathering information regarding women regarding age, address, and socioeconomic status, gynaecological and obstetrical history during initial visit to the MCHC. Participants left their mobile phone number to allow the researcher to contact them for further queries and check back on the course of their pregnancy concerning eventual

abortions, diseases during pregnancy and the baby's health. In addition, each woman continued to receive care as prescribed by her health care providers.

- 2- Collecting data regarding pregnancy outcomes has been completed through close-ended questionnaire. Collected information's included BMI before labour, the weight of the baby, the mode of delivery, and the Apgar score. The researcher was notified by the pregnant woman, her husband or a relative when labour had started. Most of the time the researcher called back to the women and her relatives to not cause them costs. So, all the information was being collected by asking the midwives through phone after the women gave birth.

3.5.2.4 Data collecting (obese groups)

After informed consent was achieved, then the researcher randomly assigned women in two groups (control and Intervention groups) as it was stated before. Data collection process of groups was conducted as following; for women who assigned to the control group were went through the same process data collecting as women in the Baseline group.

For intervention group, women continued to receive care as prescribed by her health care providers. In addition, they were invited to attend a series of six programme sessions. A second close-ended questionnaire was conducted as the rest of the above group of study. According to these information which collected through the mentioning questionnaires the researcher then compare the results with intervention group with control and baseline group to see the differences in the pregnancy outcomes among those who are normal weight with obese weight with intervention and control group.

3.5.3 Researcher role during research process

Unluer (2012) reported that for social researcher's it is crucial to clarify their research role to make the research credible. Simon (2011) suggests that in quantitative research, there is no room for a researcher role because in this type of the study the researcher is not involved in interacting with the participants. If the study is repeated by other researchers, it will give the same results since there is no interaction between participants and researcher. As it was obvious that this study was conducted with different methods at different phases, the researcher played an important role. The researcher as an educator on the educational programme felt that she played the role of listener, empowering women, transforming knowledge and facilitating discussion about obesity, cultural views regarding obesity and pregnancy. On some occasions, she felt that she was empowering women to become active. On other hand, the researchers that undertake qualitative studies take on a variety of member roles when they are in the research setting. According to Adler and Adler (1994), the researcher's role can range from a complete group membership (insider) to being a complete stranger (outsider). However, there are a variety of definitions for insider-researcher. Generally, insider-researchers are those who choose to study a group to which they belong, while outsider-researchers do not belong to the group under study (Breen, 2007). Furthermore, Denzin and Lincoln (2003), describe a qualitative researcher as an instrument of the research. This means that data are collected by researcher not by questionnaires as in quantitative approaches. In the current research, the researcher kept a research journal and diary which she recorded her reflections on the pregnant women's experiences towards the educational programme, barriers of women to attend the sessions, and teaching strategies. In the entire research process, the researcher felt like an "insider", because she had the same experiences as a pregnant

woman with regards to the following features (being Kurdish, a woman, pregnant, excessive gestational weight gain and underwent CS). Furthermore, she comes from the same culture and society which made the participants feel comfortable to share their experiences with the researcher. As stated in an article by Hudson (2012) age, gender and education features, play important roles in building rapport during interviews with participants.

Being an insider-researcher has many advantages such as having a greater understanding of the culture that is being studied; not altering the flow of social interaction unnaturally; and having an established intimacy which promotes both the telling and the judging of truth. In addition to that, the current researcher had the understanding of politics of the region and she knew how to best approach people, especially women. Apart from the advantages the insider-researcher has, there are several disadvantages such as challenges of not being a critical observer which led to a loss of objectivity. Unconsciously making wrong assumptions about the research process based on the researcher's prior knowledge can be considered as a bias (Hewitt-Taylor, 2002; DeLyser, 2001).

During the educational programme, the researcher was challenged with the role of duality. She often felt struggling to balance their role as educator, facilitator, observer and care provider. So each role produced a wide range of perspectives such as educators. She felt that it was not easy for a woman who shares the same culture like the participants to ask about barriers of not attending the sessions consistently because she already knew what the barriers are. Sometimes the pregnant women answered with surprise. They said "why you ask this question as you know better than us". Another example is when the researcher asked for some discussion regarding the effect of obesity on neonatal outcomes. Participants did not feel comfortable and they looked at each other as if to say

“why she has asked this question as she knows that we have no idea about this, she is an expert not us”.

The identification of the researcher as an educator may influence the researcher-participant interaction and quality of data shared. This may depend upon the participant's perception of health educator and previous experiences (Jack, 2008). It could be argued that it is important for a nurse or health educator to become close to research participants to extract rich data (Wilkes and Beale 2005). Conversely, one may elicit less information as participants feel coerced to participate and may limit information given (Orb et al., 2001).

As an insider another problem is that researcher may not receive or see important information. In addition to that, they may gain access to sensitive information (Smyth and Holian, 2008). So to make the research more credible the researcher had been especially aware of the possible effects of perceived bias on data collection and analysis. Participants were advised that their participation in this study and educational session were voluntary and that they were free to withdraw which would not affect their care in the health centres. Ethical issues related to the anonymity of the health centres and pregnant women were considered.

3.5.4 Data analysis process

3.5.4.1 Quantitative data analysis:

Quantitative Data were analysed using the Statistical Package for Social Scientists version 22 (SPSS). Arkkelin (2014) stated some reasons for using this Software Package in his book. Which are, firstly its popularity within business and academic circles makes it the most widely used software. . Secondly, SPSS is a versatile package which allows different type of analysis, data transformations and forms of outputs. Thirdly, SPSS is

continually updated and improved, so with each major revision a new version is produced. Field (2013) also observed that SPSS makes data analysis quicker because the programme knows the location of the variables and cases while in a spread sheet like Excel the user have to define this relationship in every analysis manually. SPSS provides its user with great ranges of graphs and charts. And lastly, SPSS provides the user with all output and result in a spare file different from the data. Unlike Excel, results of analysis placed in one worksheet and there is likelihood to overwriting other information by accident in this software package. Both descriptive and inferential statistics were used in this study.

A/ descriptive statistical analysis

Mean, medium, standard deviation, frequency distribution were used to describe sets of data and in addition to find out the relationship between data. Descriptive tests were performed for the socio-demographical data using mean and standard deviation for continuous variable like women's age, BMI and gestational weeks, whereas, median and frequencies were used for categorised variables such as women's educational level, women's occupation and pregnancy outcomes. Further, percentage and frequencies were used to summarise all demographical variables and to calculate the prevalence of pregnancy outcomes among participants.

B/ Inferential statistical analysis

Inferential statistics are ordinarily used when the researcher is inferring conclusions about the population by using data from the sample. Inferential statistical tests were used based on the nature of data. As mentioned before, the study groups were obese pregnant women with educational programme (intervention group), obese pregnant women without

educational programme (control group) and normal weight women (baseline group). The following tests were used in this study:

- The Chi square test (X^2) was used for categorical variables, to investigate the differences of pregnancy outcomes among the groups of the study such as women's occupation, level of educations, mode of delivery, number of episiotomy done, induction of labour, Pregnancy Induced Hypertension (PIH), Diabetes Mellitus (DM), admission of neonatal to intensive care unit, prolonged pregnancy, congenital abnormalities and still birth. This test was used in the current study because it can be used for categorised variables.
- Kruskal-Wallis One way analysis of variance were used for continuous variables which were not normally distributed, were among more than two groups. The rational for using this test it related to for its assumption which you can used for more than two groups unlike t test which you can use when there is two groups of the study. To find out the exact differences among three groups, the researcher used **Pairwise** test was used for comparisons among groups regarding the continuous variables like BMI, age, gestational weeks, gestational weight gains, gestational age at onset of labour, new-born Apgar score
- Hence, this method of analysis was employed in the current research as it consisted of two groups i.e. control group and the intervention group for comparison purposes among groups regarding the continuous variables like BMI, age, gestational weeks, gestational weight gains, gestational age at onset of labour, new-born Apgar score

C/ Testing Hypothesis

In a scientific way, if there is the relation between X and Y then the hypothesis is stated as (H1), oppositely, (H0) or a null hypothesis is stated when there is no relation between X and Y. Statistically, the process of testing the Hypothesis is one of disproof or reject.

Meanwhile, providing that the H1 is true is not possible. However, it is possible to demonstrate that the H0 has a high possibility of being incorrect, which provides evidence to give support to the H1. (Polit et al., 2001).

3.5.4.2 Qualitative data analysis

Qualitative data analysis allows for the experience of the individual(s) under study to be explored and better appreciated (Patton, 2002). The second arm of this study aimed to explore women's experiences regarding their perceptions and the benefits to their pregnancy outcomes.

A/ Transcriptions and translations

The first step of the qualitative data analysis involved transcribing the data through listening to the tape recordings of all qualitative data i.e. the focus groups, telephone interviews and field notes. These were transcribed in Kurdish and subsequently translated into English (see appendixes -3.10). A second Kurdish speaker checked the translations for accuracy. After that, the researcher listened to the recordings several times to become familiar with the data and to ensure that everything was captured during the transcribing process. There are many methods for qualitative data analysis including thematic analysis and content analysis. In the following part, the researcher demonstrates the rationale for the selected and preferred method for analysis.

B/ Thematic analysis

LeCompte and Schensul (1999) indicated that content analysis can be used to analyse qualitative data to evaluate the frequency of certain words and phrases. One of the disadvantages of content analysis is the summarisation of large works to brief result (Bernard and Rayan, 1998). Thematic analysis in turn has been defined as a foundation

of qualitative analysis in many fields such as health, social and psychology. In 2006, Braun and Clarke published an article on the use of thematic analysis and explained its use in a step by step manner. The reason behind using thematic analysis often is that other types of qualitative data analysis are closely specific to theories but thematic data analysis is simple and can provide a rich and complex description of the data (Braun and Clarke, 2006). Krueger and Casey (2000) suggest that a long table or computer software can be used for analysing focus group data.

Prior to beginning the data analysis, it is important to be transparent about the research process to give the reader a clear view about the research process and the strength of the findings. For the current study, thematic analysis was used to explore the experiences of the women who received the educational programme by developing themes and subthemes from the data. These themes reflected the women's experiences.

Unlike Interpretive Phenomenology analysis (IPA), which is good when working with small samples, and where there is the need to maintain a more idiographic focus, Thematic analysis (TA) is good when working with large samples with a need to focus more on patterned meaning across the data set (Smith et al., 2009). In addition, TA can be used for data that does not capture first-person accounts of personal experiences (such as focus groups or story completion tasks).

Braun and Clarke (2006), outlined the following as a guide for thematic analysis:

- 1- Familiarisation with the data. In this step, the researcher should get familiar with their data by reading and rereading the data and listening to the audiotapes. The current researcher read and listened to the data many times in a relaxed and non-hurried way. She tried to get familiar with the experiences of the participants' words by reading the transcripts repeatedly.

- 2- Coding. This is regarded as an important element for data analysis. It involves generating pithy labels for important features of the data which are relevant to the research question. In the current research, the transcripts were read line by line and codes were assigned to each line in order to identify the women's experiences toward educational programme. This aspect of coding was done with some assistance from the research supervisor.
- 3- Searching for theme. This can be described as making a coherent and meaningful pattern from the data. Sort of like "coding the code". If we regard the code as bricks with which a building is constructed, then the theme can be regarded as the walls and roof panels. In the current research, the data was analysed, and related ideas or topics were grouped into themes. For example, data regarding or related to education formed a theme while interference from family and staff formed another.
- 4- Reviewing themes. The researcher at this stage checks the themes in relation to extracted codes and the data set.
- 5- Defining and naming themes. In this this stage, the researcher conducts detailed analysis for each theme with a view to answering the question "what story does this theme tell?" For example, in this particular study, themes related to interference from family and staff were placed under the title of interpersonal relationship.
- 6- Writing up. This stage is regarded as a final stage for data analysis where the researcher tries to provide the reader with a coherent and persuasive story, about the data with context from the existing literature. In the current research, the researcher articulated her story in order to answer the research questions. The

cultural and social context of the Kurdish women who attended the programme was highlighted thereby, providing the reader with different qualitative reasons and evidence as a complement of the first phase of the study (QUAN).

3.5.4.3 Criteria for assessing quality of Mixed Method research

In recent years, quality criteria in social research has become a topic of discussion, and increasingly prominent in methodological discussions (Bryman, Becker and Sempik, 2008; Brannen, 2005). The continued development of mixed method has seen as an increasing interest to the issues of quality criteria in mixed method studies. Sale and Brazil (2004) identified criteria to critically appraise the quality of mixed method studies as documented in the health sciences. The overall goal of the Sale and Brazil was to “promote standards for guiding and assessing the methodological quality of mixed method studies” (Sale and Brazil, 2004, p. 361). It was stated that the criteria identified by Sale and Brazil, is as a result of an exercise in combining both quantitative and qualitative criteria. It has also been identified as a challenge to apply quantitative or qualitative quality criteria alone in a mixed methods study.

In the context of this study, Sale and Brazil’s (ref) framework for quality in mixed methods research was used. Sale and Brazil identified the following criteria for mixed method research:

1- Truth value (Internal validity vs. Credibility)

In quantitative approach, internal validity is one of the most essential manifestations of validity. The ultimate question is whether the researcher can draw valid conclusions from study given the research design and controls employed (Ryan et al., 2002). In the current study, the researcher used randomisation strategies during sampling as this is regarded as the best way to maintain high validity (Shuttleworth, 2009).

Mixed method approach is most appropriate because of the combination of data collection methods which were used (closed ended questionnaire, Likert type scale, and focus group) which provided researcher with rich data and description (Creswell, 2009). Secondly, the researcher used different types of sampling strategies such as random sample for quantitative part and purposive sampling (those women who received the educational programme). Thirdly, the researcher conducted many educational sessions when she was a Masters student in Kurdistan, the nature of the research process which enhances the credibility because she offered educational session and met the women frequently. An article by Lincoln and Guba (1994) suggested a number of recommendations to ensure credibility of the research in order to help the researcher to generate valid and complete data. These include on-going engagement with the data by the researcher and offering other readers to look at the text and explore further interpretations (Shenton, 2004). In this context, the researcher received support from her PhD supervisors. The support they offered included looking at the data and offering comments on emerging themes.

2- Applicability (External Validity/ Generalisability vs. Transferability)

Generalisability can be defined as the degree to which we can infer the findings from the research sample to the population (Denscombe, 2008). People, place and time of conducting the study are regarded as the major threats to external validity (Andrew and Halcomb, 2009). The result of the current study might be relevant in this region as well as in surrounding countries such as Iran, Turkey because of the similarities in social, cultural and political contexts. Therefore, generalisability of the result might be possible in some findings.

In qualitative approach, transferability refers to the degree of applicability of result to other constituencies. The current researcher used three settings for conducting focus group Shenton (2004): accumulation of data in different stages within different places provide the researcher with comprehensive data. The researcher conducted two focus groups in health centre B, three in health centre C and two in health centre A. However, all data was undertaken in one city in the region and therefore transferability of data to all contexts within and outside the country is possible especially the surrounding countries which share similarities socially, culturally and politically

3- Consistency (Reliability vs. Dependability)

Reliability means the degree of consistency with which a research tool measures what it is supposed to measure (Denscombe, 2008). To ensure reliability in the current research, pre-study and post-study questionnaires were designed according to research aims and questions. After extensive literature review to ensure coverage of all different variables around women's socio-demography and pregnancy outcomes, formal discussions with supervisors, and informal discussion with some lectures at Hawler Medical University / Nursing college and colleagues at the Directorate of Health in the Kurdistan region, the final copy of the questionnaire was designed. Regarding Likert scale questionnaire which was amended from the UK version, was also discussed by research teams (researcher, her supervisors and local advisor). The pilot study was conducted with a number of pregnant women before the main study was started. This was meant to gauge the participants' perspectives towards study tools (questionnaire and Likert scale).

Dependability in qualitative approach means that if another researcher conducted the same study with the same method, same participants, and same context then they should find similar results. Whilst methods and contextual setting can be repeated, the same

participants may not agree or be available to repeat the research, they may have another pregnancy or experience other life circumstances and the actual setting will have changed as well.

5- Neutrality (Objectivity vs. Confirmability)

Objectivity refers to a truth or independent reality existing outside of any investigation or observation. The researcher's task in this model is to uncover this reality without contaminating it in any way (Pandey, 2014). In the current research, in collecting the quantitative data the researcher used this stance which fits within the positivist domain.. However, in collecting the qualitative data, as a researcher who comes from the same culture, I recognize that actually my role in the research process was based more upon a constructivist stance where there was a co- creation of knowledge produced between myself as researcher and the women who contributed to the qualitative arm of the study. The researcher used reflectivity to avoid a self-fulfilling prophecy. Reflexivity is an attitude of attending systematically to the context of knowledge construction, especially to the effect of the researcher, at every step of the research process. As defined by Malterud (2001) "A researcher's background and position will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions" (Malterud, 2001, p. 483-484). For example I was conscious that I needed to be aware of my own views on what was happening, and not limit the interpretation of the data by my own viewpoint. Therefore I ensured that any interpretation was supported by the voice of participants and I consciously looked for alternative interpretations of what was happening when women were talking to me about their experience.

3.6 Part five: Ethical considerations

The most important part for undertaking research with human beings are ethical considerations (Parahoo, 2006). These should be considered throughout the entire research process from choosing the topic step till publication of the result of the study (Parahoo, 2014). Holloway and Wheeler (2013) stated that ethics for health professional/researchers is concerned with guiding professional to protect and safeguard the interest of clients. The following ethical considerations have been included in the research study: consent, anonymity, privacy, withdrawing and exploitation. The researchers prepared two information sheets, which were given to the control group and the obese groups. The information sheet included title of the study, a full explanation about aims and objectives of the study, name, telephone number and email address of researcher, supervisors and local adviser. They were informed that attending the study and educational programme were voluntary. Those invited to attend focus group sessions were informed about the process of the interviews and agreed to being audiotaped. Once informed consent was obtained, the consent form was signed. Participants were also informed that the audiotapes would be destroyed after use. During the focus group, some women requested to leave, so the researcher let them go but they offered to attend the focus group another time.

3.6.1 Consent:

It was crucial to confirm that all participants gave their full informed consent to participate in the study and/or to have access to their medical records. Potential participants were identified at the initial visit, which occurs around 12 weeks of gestation. The researcher, with the help of health care providers, verbally brought to the potential participant's attention the study and provided an information sheet and a written consent

form which explained the purpose of the study for women and requested their consent to participate. The researcher provided verbal information about the study, its aims and mode of conduct. Throughout the study the researcher was willing to answer any questions by participants. At this meeting women who were interested in participating then met with the researcher to discuss any further questions before agreeing to participate. Thus, ensuring that participants were able to give their full and informed consent.

3.6.2 Educational sessions and focus group at primary health centre

Primary health centres were provided a suitable venue for the researcher to run the educational programme. The researcher requested administrative staff at the respective health centres to schedule their sessions to avoid overlapping of events at the centres. During the sessions, the researcher considered the women's feelings because obesity is a sensitive subject. For instance, the researcher did not refer to the women as 'obese' or use the word 'obesity'. Instead, the word 'overweight' was used during sessions. According to the literature, in Western countries, obesity is described as a stigma and sensitive concept (Puhl and Heuer, 2009), and hence should be discussed carefully. In Kurdish culture, obesity is predominantly perceived as a sign of beauty and health. Stigmatisation regarding obesity in Kurdish culture is not so obvious. During the lectures, at the start of data collection, the researcher, in consideration of these different perceptions, mostly refrained from using the term 'obesity'. Instead, the researcher used 'weight gain' and 'overweight'. It became evident during the course of data collection, that research participants used the term 'obesity' as a signifier for health and to express pride in some occasions. The researcher refrained from using the term throughout the lectures.

3.6.3 Withdrawing and Exploitation:

In the beginning of the study the researcher informed all participants that they were allowed to withdraw from the study without having to give their reasons, and that the decision to withdraw would not affect current and future care that they received from the respective centres.

Research with human subjects should ensure that they are not exposed to harm in a situation neither to a situation for which they were not prepared for. In the current study, the participants were informed that the results of the study would not be used against them, but to fulfil the aims of this project.

3.6.4 Confidentiality and anonymity.

All questionnaires were anonymous. Each questionnaire was ordered according to a coding system, which included date and the number of the questionnaire in the same date e.g. 1 January 2012/ Q1, 1 January 2012/ Q2. When transcribing these files, names were not transcribed. All data were stored in a locked filing cabinet only available to the lead researcher. All electronic data were stored on a passwordprotected computer. When writing papers for publication, any means of identifying participants were removed. The audio and transcripts of the focus groups together with questionnaire data are to be kept for a period of five years and then destroyed.

3.6.5 Benefit/ Risk Ratio

Mainly, the basic benefits of the study to participants are according to (Polit and Beck, 2008): Access to an intervention to which they might otherwise not have access (all participants had the same likelihood of being selected for intervention through randomization). Gratification in being able to discuss their situation or problem with a non-judgmental and friendly person. Increased knowledge about themselves or their conditions, either through opportunity for introspection and self-reflection or through

direct interaction with the researcher. Direct monetary or material gains through stipends or other incentives. As this study comprised an intervention programme, the likely risks would be associated with disagreements with cultural norms. As an example, the conflict between women thinking that obesity is good and the researcher tell them in not. Or having a big baby valued among women in this region.

3.11.6 Protection of Human Rights

In the current study the following rights have been considered:

- Right to self- determination: participants were assigned consent form which included all relevant information.
- Right to Privacy and Dignity: Privacy means persons freedom to decide on circumstance, time and extent under which their privation during sharing with others. While human dignity is the right to make informed decision and volunteer to participate in the study. In the current study, the researcher made the participation days flexible for women, but the time was fixed. Participants also left behind their telephone numbers if they were interested in attending, time allowing them.

3.6.6 Data storage

All participants were informed about the aims of data collection and recording tapes. Participants were assured that the data would be confidential. Furthermore, they were informed that their data was anonymised so that they would not be recognisable directly and indirectly. No names were used in entire the study and each participant was given a unique code number. All raw papers documents were stored in a lock and key box at researchers home and the room in which the boxes were kept is locked. The participants were informed that the documents would be kept for five years then destroyed. The

primary data and the soft copies data were stored on CD, memory sticks and the computer network at De Montfort University (DMU). In order to prevent any damage or loss, a special password for each data storage was provided.

3.7 Summary of the chapter

This chapter discussed the research process and methods which were used during data collection in this research. In addition to this, the chapter covered research aims, questions and research designs. Sampling and statistical plans were also reported in this chapter. Development of the educational programme was discussed in the chapter in details. Finally, qualitative data analysis and thematic analysis were covered. In addition, ethical considerations and challenges were discussed. In the next chapter, the researcher presents quantitative and qualitative results separately, followed by a combination of the results.

CHAPTER FOUR: RESULTS

Introduction

This chapter presents my research findings. Part one of this chapter presents the quantitative findings of the randomization which investigated the feasibility of assessing the effectiveness of an educational programme on the pregnancy outcomes among obese women. Part two includes two sections. Section one presents the findings from the self-evaluated questionnaires to evaluate the educational programme by the women in intervention group. Section two presents the qualitative data from the focus group discussions which explored women's experiences regarding the programme, and their perceptions of benefit to pregnancy outcomes. This chapter closes with bringing the main findings together.

4.1 Part One: Quantitative results

This part presents the quantitative findings of the two closed-ended questionnaires (see Chapter Three) and women's attendance rate to the intervention sessions. Findings are presented in three main sections. Section one presents the sociodemographic information of women of the study sample, their attendance rate to educational sessions and the analysis of a feasibility RCT data. Section two presents the quantitative data results and discusses the testing of the research hypothesis. Finally, the third section presents the relationship between women's attendance rate and pregnancy outcomes.

To remind the reader of the research questions and research hypotheses that the researcher sought to answer and tested respectively (see table 4.1):

Table 4.1: List of the research questions and research hypotheses

Research Questions	<ul style="list-style-type: none"> •What are the pregnancy outcomes for normal weight women (baseline group) •What are the pregnancy outcomes for obese women (control group)? •What are the pregnancy outcomes for obese women (intervention group)? •Does the baseline group have better pregnancy outcomes than the control group? •Does the intervention group have better pregnancy outcomes than the control group? • Is it feasible to carry out a large scale study to answer the above questions in the setting of Kurdistan region of Iraq? • Will such a study, its protocol and the intervention for obese pregnant women be acceptable to participating women?
Research Hypotheses	<ul style="list-style-type: none"> • Normal weight women (baseline group) will have improved pregnancy outcomes compared to obese group (intervention and control group). • Obese women who participate in a health educational programme (intervention group) will have improved pregnancy outcomes compared to those who do not participate in the programme (control group).
The research hypotheses for a large scale trial	<ul style="list-style-type: none"> •Antenatal educational programme improves maternal outcomes among obese pregnant women •Antenatal educational programme improves labour outcomes among obese pregnant women •Antenatal educational programme improves neonatal outcomes among obese pregnant women.

To answer the above research questions and test the hypotheses, descriptive and inferential statistical analyses were used. Before starting any statistical test, the researcher tested all data for normality, followed by a test to ascertain if randomisation works or not.

4.1.1 Testing for Normality

Before deciding on the right test for analysing, normality should be conducted for continues data based on the following table on assumptions of normality (Field, 2013), Table 4.2.

(4.2) Assumptions of Normality

Testing normalities	Value	Outcomes
Visual inspection	Weren't bell shaped	Not normally distributed
Kolmogorov-Smirnov ^a (sample size more than (50))	$p < 0.05$	Not normally distributed
Skewness and kurtosis	They can't be found between -1.98 and +1.98	Not normally distributed

All scale variables which were used in current study were non-normally distributed by conducting normality test for women's age, BMI, gestational weight gain length of labour (measured in hours), and birth weight. As an illustrative example, normality test were conducted for BMI and the results for Kolmogorov-Smirnov^a ($p < 0.05$), visual inspection of their histograms, normal Q-Q plots and Box plots showed that the women's BMI at initial visit among three groups were non- normally distributed, with Skewness of -0.905 (SE=0.245) and a kurtosis of -0.397 (SE= 0.485) for Baseline group, a Skewness of 1.535 (SE=0.251) and a kurtosis of 1.457 (SE= 0.498) for control group and a Skewness of 1.504 (SE=0.244) and a kurtosis of 0.178 (SE= 0.483) for intervention group. BMI should be considered as non-normal distributed data, so nonparametric tests should be selected. For other scale variables the above test was used to check for normality as it has been stated before.

4.1.2 Testing Randomization

Kruskal-Wallis test was used to check whether the randomisation worked or not, the rationale behind choosing this test being that BMI were non-normally distributed as previously shown. The Kruskal-Wallis test is used when the variable is non- normally distributed as well as when there are three groups.

4.1.3 Sociodemographic information of women of the study sample:

Data regarding sociodemographics characteristics were collected in the first closedended questionnaire during the participating women's initial visit to the health centres. Descriptive statistics, such as frequencies and percentages were calculated for nominal data, means and standard deviation (SD) for continuous data (interval data). The results were used to describe women's general characteristics.

Table (4.3) Sociodemographic information of women of the study sample

Women Characteristic		Baseline group	Control group	Intervention group	Statistical Test
Women`s age	N	99	97	96	Kruskal-Wallis test (P value) Baseline Vs. control 0.000(HS) Baseline Vs. Intervention 0.000(HS) control Vs. Intervention 1.000(NS)
	MIN	15	17	18	
	Max	38	43	43	
	Mean	25.04	28.94	28.62	
	SD	4.95	5.43	5.97	
Gravidity among women	Prima gravida	58 (58.6)	25 (26%)	30(32.0%)	Chi-Squared (P value) Baseline Vs. control 0.000(HS) Baseline Vs. Intervention 0.000 (HS) control Vs. Intervention 0.365 (NS)
	Multi gravida	41(41.4)	71 (74.0%)	66(68.0%)	
	Total	99(100.0)	96(100%)	96(100.0%)	
Occupations among women	Housewife	63(63.6)	70(72.2%)	72(74.2%)	Chi-Squared (P value) 0.229 (NS)
	Employee	36(36.4)	27(27.8%)	24 (25.8%)	
	Total	99(100)	97(100%)	96 (100%)	
Level of educations					
a/ Literate	BSc/ Diploma	45 (45.5)	28(28.9%)	26 (26.8%)	Chi-Squared (P value) Baseline Vs. control 0.023 (S) Baseline Vs. Intervention 0.000 (H.S) control Vs. Intervention 0.392 (NS)
	Secondary school	26(26.3)	23(23.7%)	14(15.5%)	
	Primary school	22(22.2)	31(32%)	35(36.1%)	
b/ Illiterate (can`t read and write)		6(6.1)	15(15.4%)	21(21.6%)	
	Total	96(100.0)	97(100%)	96(100%)	
Gestational age at initial visit among study groups	N	99	97	96	Kruskal-Wallis test (P value) Baseline Vs. control 0.48 (S) Baseline Vs. Intervention 0.30 (S) control Vs. Intervention 1.00 (NS)
	Mean	16.87	17.99	17.88	
	SD	3.10	2.45	2.63	

N: Number; MIN: Minimum; MAX: Maximum; SD: Standard Deviation; Vs: Vice versa; P: probability value; HS: Highly Significant; NS: not significant. Kruskal-Wallis test (P value)

The above table has also shown that women in the baseline group were younger than women in the other groups (control and intervention). It has showed that just under three quarters (74% & 68.0%) of women in both obese groups (control and intervention) were multigravida, it means prim para were younger than obese groups . On the other hand, the majority of women in the baseline group (58.6%) were younger and primigravida. The statistical significance is demonstrated in the table. The table has presented that there were highly significant statistical differences among women in the baseline group and among women in both obese groups (control and intervention groups) regarding their number of pregnancies. That means most women in the obese groups had more than one child, unlike the majority of women in the baseline group, who had one child.

The questionnaire data also illustrated that the vast majority of women, 74.2% of the intervention and 72.2% of the control group, were housewives, whereas 63% of women in the baseline group were housewives. The table has showed that women in the obese groups were more likely to be staying at home and had no job compared to women in normal weight group, but there were no statistical differences (P value > 0.05).

Regarding women`s level of education, the table shows that about half 45.5% of women in the baseline group had a BSc/Diploma, while 6.1% of them were unable to read and write (illiterate). Women in the control and intervention groups, 32% and 36.1% respectively had graduated from primary school. The table also has showed that there were statistical significant differences (P value = 0.023 and 0.000) among normal weight women in comparison to obese women. This indicated that normal weight women were more likely to have higher education level than obese women in the control and intervention groups. The mean and SD of gestational age (GA) at initial visit were 16.87

(3.10) weeks of women in the baseline group, and 17.99 (2.45), and 17.88 (2.63) weeks respectively of obese women in the control and in the intervention groups. To test whether it was statistical significant, Kruskal Wallis test was employed. The results have demonstrated that women with normal weight were more likely to visit earlier to antenatal care unit than obese women in the control and in the intervention groups.

4.1.4 Attendances rate among women to educational sessions and their relationship to the pregnancy outcome.

In this section, the researcher presents the attendance rate among participants and the frequency of each session which were participated by women. Furthermore, the section covers the relationship of women`s pregnancy outcome with mean score of attending the educational programme.

Attendance rate

Table 4.4 shows that 100% of women attended the first educational sessions, which provided an overview on pregnancy and health, body changes and minor discomfort during the pregnancy). The reason for the high attendance is that women attended the sessions after they agreed to attend the session and they signed to consent form in the same day. That is why the first session had the highest attendances rate. Also the second session (topics: obesity and pregnancy, BMI, recommended weight gain according to mother weight and food best avoided during pregnancy), which also had good attendance rate (77.76%). Sessions four (topic: labour, stages of labour and way of coping with labour pain) and session six (topic: education around feeling healthier after delivery of babies), which also included a focus group discussion, also showed a low attendance rate (26.96% and 23.04%) respectively. This result indicates that women were more likely to attend sessions which dealt with pregnancy, minor discomfort during pregnancy, how

they can choose the right food during pregnancy, voided food during pregnancy and general information regarding impact of obesity on pregnancy including mothers/babies. (See appendix 3.1- for contents of the educational programme).

Table (4.4) Attendance rate among women in the intervention group of the study

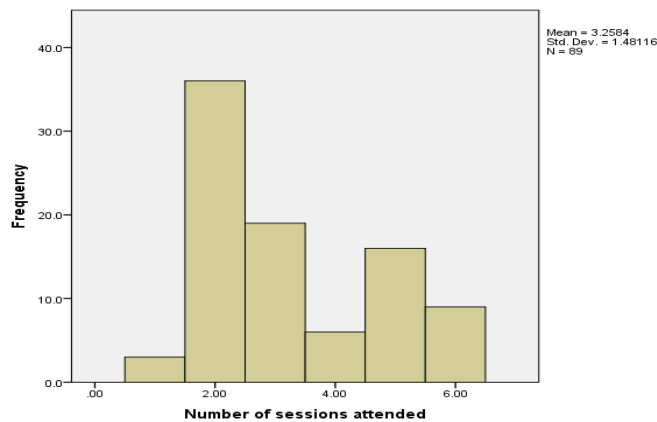
Sessions	Yes		No	
	F	%	F	%
1 st session	96	100	0	0.0
2 nd session	81	77.76	15	22.24
3 rd session	39	37.44	57	62.56
4 th session	26	26.96	70	75.04
5 th session	38	37.44	58	62.56
6 th session	24	23.04	72	76.96

The following table (4.5) and figure (4.1) show that the majority of women (41.28%) attended two sessions out of six. Around one fifth of the women (20.16%) attended three sessions, whereas just 8.64% of women attended all sessions. This result indicates that the attendance rate among women were very low as most of them had attended only two sessions.

Table (4.5) Number of sessions which were attended by women

Number of session	F	%
One session	4	3.84
Two sessions	43	41.28
Three sessions	21	20.16
Four sessions	6	5.76
Five sessions	13	12.48
Six sessions	9	8.64
Total	96	100.0

Figure (4.1) Frequencies of sessions attended by women



4.1.5 Analysis of quantitative data (pregnancy outcomes)

This feasibility research was not powered to detect statistically significant effects. Instead, the main interest was in descriptive findings and exploratory analyses to inform the feasibility of a full-scale randomised controlled trial. Appropriate inferential analyses were performed, but the test needs to be interpreted with caution due to the small sample size.

The key pregnancy outcomes which were investigated in this study were maternal, labour and neonatal outcomes. The maternal outcomes were weight gain during pregnancy, PIH, Gestational diabetes, and gestational age at onset of labour. The labour outcomes investigated were the mode of delivery, induction of labour, episiotomy and length of labour. The neonatal outcomes investigated were the 1st mints Apgar score, neonatal birth weight, still birth and new-born admission to the ICU and birth defects. The above-mentioned pregnancy outcomes will be discussed in the following sections through conducting descriptive statistical analyses including; mean, SD, frequency and percentage. Furthermore, inferential statistics were used to find out the differences among groups regarding the above pregnancy outcomes.

Table (4.6) Pregnancy outcomes among study groups

Pregnancy outcomes		Baseline group	Control group	Intervention group	Statistical Test
Gestational weight gain (kg)	MEAN	13.2967	10.99	9.67	Kruskal Wallis test baseline VS control (0,00(HS) baseline VS intervention 0.00(HS) Control VS intervention 0. 435 (NS)
	SD	5.32133	4.98	4.29	
	MIN	3.00	2	2	
	MAX	30.00	29	21	
Prevalence of PIH		14 (15.1)	17 (19.3%)	14(15.6%)	Chi-Square test 0.704 (NS)
Prevalence of Gestational diabetes		5 (5.54)	11(12.5%)	3(3.3%)	Chi-Square test baseline VS control 0.07 (NS) baseline VS intervention 0.397(NS) Control VS intervention0.02 (Sig)
Gestational age at onset of labour (weeks)	Premature (before 37 weeks)	7 (7.5%)	9 (10.1%)	5(5.6%)	Chi-Square test 0.56
	Mature (37-42 weeks)	86 (92.5%)	80 (89.9%)	84(93.3%)	
	Post- mature (before 37 weeks)	0(0)	0(0)	1(1.1%)	
	Total	93 (100.0)	89(100)	90(100.0)	
Mode of delivery	(NVD)	57 (61.3%)	35(39.8%)	38(42.2%)	Chi-Square test baseline VS control (0,006(HS) baseline VS intervention 0.036(S) Control VS intervention 0.238 (NS)
	Emergency c/s	21(22.6%)	23(26.1%)	31(34.4%)	
	Elective c/s	15(16.1%)	30(34.1%)	21(23.3%)	
	Total	93(100.0)	88(100.0)	90(100.0)	
Prevalence of induction of labour among study groups		49(52.7%)	29(33.0%)	19(21.1%)	Chi-Square test baseline VS control (0,00(HS) baseline VS intervention 0.00(HS) Control VS intervention 0.06(NS) (NS)
Prevalence of Episiotomy among study group		54(58.1%)	29(33.0%)	25(27.8%)	Chi-Square test baseline VS control (0,00(HS) baseline VS intervention 0.00(HS) Control VS intervention 0.8(NS)
Length of labour (Hours)	MEAN	8.7306	9.63	8.80	Kruskal Wallis test 0.669 (NS)
	SD	5.59008	5.52	5.46	
	MIN	1.00	3	1	
	MAX	20.00	20	24	
First minute new-born's Apgar score	0-3	0 (0)	2(2.3%)	3(3.4%)	Chi-Square test 0.6 (NS)
	4-6	21(22.8%)	24(27.3%)	19(21.3%)	
	7-10	71(77.2%)	62(70.5%)	67(75.3%)	
	Total	92(100.0)	88(100.0)	89(100.0)	
Birth weight (kg)	MIN	2.00	1.2	1.2	Kruskal Wallis test 0.880 (NS)
	MAX	5.25	4.8	5	
	MEAN	3.19	3.19	3.22	
	SD	0.63	0.78	0.84	

Prevalence of Still birth among study groups	4 (4.43)	5(5.6%)	2(2.2%)	Chi-Square test 0.21 (NS)
Prevalence of Admission of new-born to the ICU	7 (7.5%)	10(11.4%)	8(8.9%)	Chi-Square test 0.27 (NS)
Prevalence of birth defect among study groups	4 (4.3%)	2(2.3%)	3(3.3%)	Chi-Square test 0.5 (NS)

N: Number; MIN: Minimum; MAX: Maximum; SD: Standard Deviation; Vs: Vice versa; P: probability value; HS;

Highly Significant; NS: not significant. Kruskal-Wallis test (P value)

The above table (4.6) has presented that weight gain during pregnancy among women for baseline group ranged from 3-30 kg with a mean of 13.29kg and a SD of 5.32 kg. For the obese pregnant women control group it ranged 2-29 kg with a mean of 10.99kg and a SD of 4.98 kg, whereas for obese intervention group it ranged 1-21 kg with a mean of 9.67 kg and a SD of 4.29 kg. After conducting the Kruskal Wallis test, the results indicated that women in the baseline group were more likely to gain weight in comparison to women in intervention and control groups.

In regarding to the PIH among women; it is clear from table (4.6) that PIH was more prevalent (19.3%) among women in the control group when compared with women in the baseline group (15.1%) and intervention group (15.6%). Results using Chi-Square test indicated that there were no statistical differences among groups. That means that the educational programme made no differences among women regarding the prevalence of PIH.

Regarding gestational diabetes mellitus (GDM); Gestational diabetes was seen most frequently among women of the control group (12.5%), while 5.4% were seen among women in the baseline group and 3.3% were seen among women in the intervention group. After conducting Chi-square, the test showed that there were statistical differences. This means that GDM can be seen more in the obese women in the control group and less among women in the intervention and baseline groups.

The same table shows that the majority of premature cases (10.1%) can be seen among women in the control group (9.3% and 9.2%) respectively among women in the intervention and baseline groups. This shows that obese women were more likely to deliver their babies earlier than normal weight women. In addition to that, women who received the education learned to cope with labour pain and tended to wait for their normal labour unlike women in the control group who preferred caesarean section. A closer discussion follows. Results using Chi squared test have shown that there were no statistical differences among women in study group Gestational age at onset of labour (weeks).

Mode of delivery is one of the labour outcomes which was investigated in this study (table 4.6). The majority of women in the baseline group (61.3%) delivered their babies normally, whereas 34.4% and 34.1% respectively of women in the intervention and control groups delivered their babies by Caesarean section (including emergency and elective). That means normal weight women were more likely to deliver their babies normally (including induction and episiotomy).

Table (4.6) shows that the vast majority of women 52.7% in the baseline group were induced during their delivery, whereas 33.0% and 21.1% respectively of women in the control and intervention group were induced. Therefore, this result indicated that normal weight women were more likely to be induced during their delivery compared to other groups of the study. The table showed that the majority of women in the baseline group (58.1%) had episiotomy during labour whilst 33.0% and 27.8% respectively of women in the control and intervention group had episiotomy during delivering their babies. This result adds to the fact that most women in the baseline group delivered their babies

normally with induction and episiotomy and the educational programme made no difference on reducing the prevalence of episiotomy among groups of women.

Length of labour is regarded as a labour outcome that was investigated in this study. As was shown in table 4.6, the length of labour among women in the baseline group ranged between 1-20 hours with a mean and SD of 8.73 (5.59) hours. While among women in the control group ranged 3-20 hours with a mean and SD of 9.63 (5.52) and for women in the intervention group ranged 1-24 hours with a mean and SD of 8.80 (5.46) hours. This shows that there were no statistical significant differences among women regarding length of their labour. Means education made no differences among women regarding length of labour.

Table 4.6 shows that the majority of babies of women in the baseline group (77.2%) were delivered with Apgar score more than 7 score. Similarly, 75.3 % of the babies of women in the intervention group and 70.5 % of babies of women in the baseline group were delivered with Apgar score more than 7 score. The result showed that the first minute babies Apgar score among women in the baseline and intervention groups were better than women in the control group. After statistical tests were employed, the result has shown that there was no statistical significant difference, which means the educational programme made no differences on babies first mint Apgar score.

The table also has shown that birth weight among women in the baseline group ranged between 25.25 kg with the mean and SD of 3.19 (0.63) kg, while among women in the control group the weight ranged between 1.2-4.8 kg with a mean and SD of 3.19 (0.78) kg. Moreover, among women in the intervention group ranged 1.2-5 kg with a mean and SD of 3.22 (0.84) kg. These results show that women in the baseline group were more likely to have a big baby than women in the control and intervention groups, but after

inferential test was employed the results indicated that there were no statistical significant differences among groups of women regarding birth weight (P value = 0.88).

Regarding the prevalence of still birth among women, the table indicated that 2.2 % of women in the intervention group delivered dead baby or still birth, whereas 4.3% of women in the baseline group and 5.6% of women in the control group delivered stillborn. That means that stillbirth can be seen steadily higher among obese women in the control group. After employing Chi squared test the result indicated that there were no statistical differences among women so the education made no differences in regarding to prevalence of still birth.

Admissions of new-born is another neonatal outcome that was investigated in this study as was shown in table (4.6). Among women in the control group, 11.4% of new-born babies were admitted to ICU, whereas 8.9% and 7.5% of the babies of women in the intervention and baseline groups of the study were admitted to the ICU. So admitting a new-born into the ICU was more common among women in the control group, but statistically there were no differences. The table also shows that 4.3% of women in baseline group (3.3%) and 2.3% of the women in intervention and control groups delivered their babies with a certain types of birth defect. The most common birth defects were clef pallet and hydrocephalus.

4.1.6 Summary of the quantitative arms of the study:

- 1- Women in the baseline group were younger than obese groups. At the same time they were more likely to have one child unlike the obese women who had more than one child.
- 2- Women in the obese groups (control and intervention) were more likely to stay at home and had not job, unlike women in the baseline group were more likely had a job.

- 3- The majority of women in the baseline group graduated from university and had a diploma unlike obese women in the control and intervention groups who graduated from primary school.
- 4- Women in the baseline group were more likely to attend their initial visit earlier than obese women in the (control and intervention) groups.
- 5- Most of the women in the intervention group were attending two sessions of the educational programme.
- 6- Women in the baseline group were more likely to gain weight than women in the obese groups including control and intervention.
- 7- The prevalence of gestational diabetes mellitus can be seen more among women in the baseline and control groups unlike intervention group which had less prevalent rate of GDM (details of education programme is in Appendices 3.1).
- 8- Women in the baseline group were more likely to deliver their babies normally whilst obese women in intervention group delivered their babies by emergency caesarean section and women in the control group delivered their babies by elective CS.
- 9- The prevalence of episiotomy and induction of labour can be seen more among baseline group compared to control and intervention groups of women.
- 10- There were no differences regarding neonatal outcomes among groups of women.

4.1.7 Testing study hypothesis

- To answer the first research hypotheses – that normal weight women (baseline group) will have improved pregnancy outcomes compared to obese group (intervention and control group), the researcher found out that the hypotheses has to be rejected. There were no statistical differences regarding PIH, gestational diabetes, gestational age at onset

of labour, length of labour, birth weight, first minutes Apgar score, birth defect, admitting new born to the ICU, still birth between baseline and control groups of women. Therefore, it accept Null hypothesis and reject alternative hypothesis which said that there is a differences in between these two groups regarding the above stated pregnancy outcomes. On the other hand, alternative hypotheses has accepted negatively when there were statistical differences in regarding to the mode of delivery, prevalence of episiotomy and induction of labour. The only differences which found between baseline and control group was the total weight gain during pregnancy. The result accepted the alternative hypothesis which said that obese women will have less weight gain during pregnancy compared to normal weight women.

- Regarding the second hypothesis which stated that the control group will have better pregnancy outcomes than intervention group, the researcher found that the hypothesis is true with regards to gestational diabetes mellitus. An alternative hypothesis which said that there were differences in between two groups regarding GDM was accepted. While the hypothesis was rejected in regards to PIH, gestational age at onset of labour, mode of delivery, prevalence of episiotomy and induction of labour, weight gain during pregnancy, length of labour, first minutes Apgar score, birth defect, admitting new born to the ICU, still birth, and birth weight between women in the control and intervention groups of the study. So it was accepted Null hypothesis and rejected alternative hypothesis which said that there is a difference in between these two groups regarding the above pregnancy outcomes.

The next section of this chapter presents findings of qualitative arm of the study. At first, it presents women`s evaluation to the educational programme by using Likert scale. Next, it demonstrates women`s characteristics of the focus groups and telephone interviews.

4.1.8 The relationship between women attendance rate to the educational programme and their pregnancy outcomes

In this section, the researcher demonstrates the association between women's attendance to the educational programme and their pregnancy outcomes to see if it positively or negatively affected their pregnancy outcomes or had no effect. To test the relationship, Pearson Correlation (**r**) was employed.

Table (4.7) Pearson Correlation coefficient between women attendance rate to the educational programme and pregnancy outcome.

Pregnancy outcomes	Mean score of attendance rate among women	
	R	P value
PIH	-.027	0.804 (NS)
GDM	-.030	0.781(NS)
GA	-.002	0.984(NS)
GWG	-0.024	0.830(NS)
Mode of Delivery (CS)	-.087	0.417(NS)
Length of labour (hours)	-0.046	0.724(NS)
Induction of labour	-.250*	0.017 (S)
Episiotomy	-.082	0.442(NS)
Birth weight	0.169	0.118(NS)
First Minute Apgar score	-0.006	0.955(NS)
Birth defects	-.030	0.781(NS)
Still birth	-.114	0.283(NS)
Admission new- born to ICU	0.015	0.886(NS)
r = Pearson Correlation coefficient		
N= 90		

As table 4.7 shows, there was a negative but not a significant relationship between mean score of women's attendance rate and the prevalence of PIH and GDM, GA at onset of labour, GWG, mode of delivery, length of labour, prevalent of episiotomy, birth weight, first minute Apgar score, birth defects, and still birth and admission new-born to ICU. That means that with increasing attendance rate among participants the adverse pregnancy outcomes were being decreased but statistically it did not show (P value

≥ 0.05). While the relationship of women's attendance mean score and the prevalence of induction of labour was negative, it was significant. That means that increasing number of attendance among women reduced their chances of having labour induced.

4.2 Part Two: Qualitative results. Evaluation of the educational programme and exploration of women's experiences regarding the programme

4.2.1 Introduction

The previous part discussed the key findings of the quantitative data obtained from the questionnaires, as well as the attendance rate of the participant to the educational programme and their relationships to their pregnancy outcomes were presented. This part discusses the qualitative findings in two sections. Section one presents the findings from self-evaluated questionnaire (Likert type scale), ordered to evaluate the educational programme by the women who have been in the intervention group of the study. Section two presents the findings from focus group discussions (qualitative data) which explored women's experiences regarding the programme and their perceptions of benefit to pregnancy outcomes. Before the results of the qualitative arm of the study are presented, the characteristics of women who attended the focus group and phone interview are described.

In the qualitative part, obese women were invited to attend focus group discussion and encouraged to speak and share their experiences during the educational programme, and the effect on their pregnancy outcomes. Thus, this enabled the researcher to obtain an insight into a number of aspects of efficacy of the educational programme on some outcomes, and those that it did not have effect on.

To remind the reader about qualitative method used in the study, thematic analysis was employed to analysis the focus group and phone interview transcripts. Quotes from the

entire focus group and telephone interviews were included to reflect a range of ideas and thoughts. Complete lists of focus group and phone interviews codes are shown in appendix 3.9 & 4.1. Themes which emerged during focus group discussions included antenatal educational programme, culture, weight management, and medicalisation of birth.

Findings from this section were used to clarify the result of the quantitative findings and reasons behind unexpected outcomes. Furthermore, they show that the mixed method approach was useful in supporting the final results.

4.2.2 Section one; Analysis of self-evaluated questionnaire to the educational programme and pregnancy outcome

This section presents the evaluation of educational programme by the women who have been in the intervention group of the study. For this, the Likert type scale was used. Women were asked to rate their degree of satisfaction from one (strongly dissatisfied) to ten (strongly satisfied). The collection of data was done in the fifth session of educational programme, as it discussed in the methodology chapter.

Descriptive data analysis has been used to demonstrate women's evaluation of the programme. To evaluate the educational programme the following questions were asked.

- How much do you recognise the importance for you to make lifestyle changes to improve you and your family's health?
- Do you feel you have the right amount of knowledge and skills to make these changes?
- How motivated are you to make the necessary lifestyle changes to improve your health?
- How confident are you on your ability to make a difference to you and your family's health?
- How prepared do you feel for the birth?

Table 4.8 shows that the Mean and SD of women who answered the question ‘How confident are you on your ability to make a difference to you and your family’s health?’ is 6.9500 (1.73870). This indicates that women felt confident in their ability to make changes to their own and their families’ health. The Mean and SD of women for answering ‘How prepared do you feel for the birth?’ was 5.6750 (3.23750), that means that it is not very important for pregnant women to prepare themselves for the birth of their babies.

Table (4.8) Mean and SD of women’s self- evaluation to the programme and pregnancy outcomes.

Self-evaluation questions	Mean	SD
How much do you recognise the importance for you to make lifestyle changes to improve you and your family’s health?	6.3250	1.80295
Do you feel you have the right amount of knowledge and skills to make these changes?	6.6000	1.95854
How motivated are you to make the necessary lifestyle changes to improve your health?	6.5000	2.02548
How confident are you on your ability to make a difference to you and your family’s health?	6.9500	1.73870
How prepared do you feel for the birth?	5.6750	3.23750

Likert scale responses from 1-10 given, 1 being the least and 10 being the most

In the next section, the researcher explored women’s experiences of the educational programme and their perceptions of benefits and limitations to their pregnancy outcomes through conducting focus groups and phone interviews.

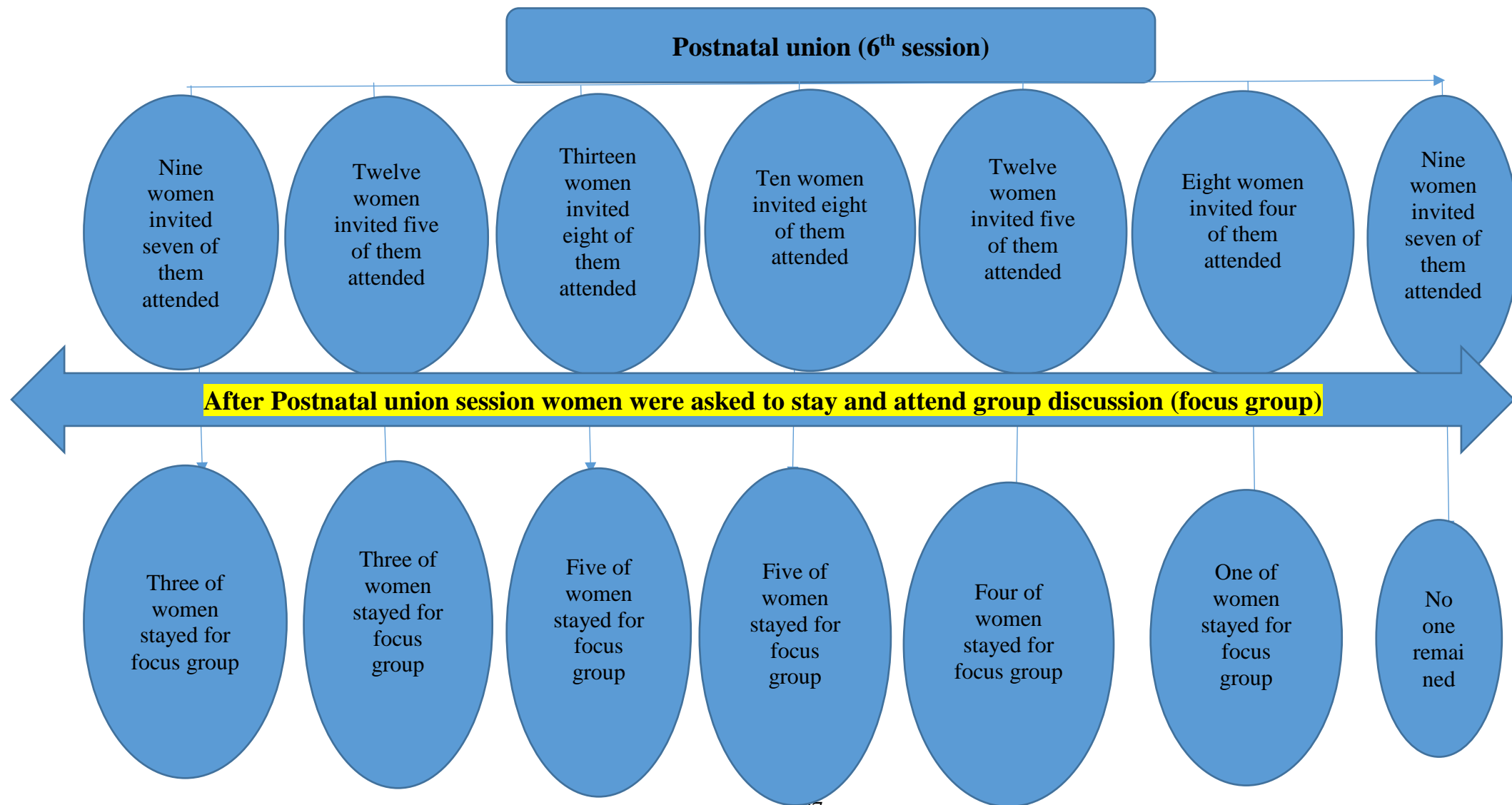
4.2.3 Section two; Qualitative result

In this section the researcher presents characteristics of the women that have attended the educational programme, and the themes that emerged from the findings.

4.2.3.1 Characteristics of focus groups and telephone interviews participants;

A total of six focus groups (two in health centre A, one in health centre B and three in health C) and sixteen phone interviews were conducted (see appendices- 4.2). Initially, women were asked to remain for the focus group directly following the sixth session (postnatal reunion; see diagram 4.1). Some women gave excuses for not attending the focus group discussions. Women who attended focus groups were from different health care centres as well as different background of socio-economic class and educational levels. The focus group discussions were held in friendly environmental conditions. Women who participated were encouraged to speak freely and express their ideas to the researcher. The researcher found that at every focus group something new arose, but still some things were repeated. However, because the study took more time than what was expected, and women were not attending the reunion session in sufficient numbers, focus groups data collection stopped. The researcher then contacted those who had been invited to attend focus groups, but had not attended, and with their consent, conducted telephone interviews instead. This also gave women the opportunity to explain the reasons for not attending educational sessions. Focus groups were found inactive as a result of small numbers of participants per group. The reasons behind small numbers were due to some difficulties. For some women, the distance between centres was far, so they were not able to come to another centre to attend group discussions. Ultimately, only six to seven women were able to attend group discussion per centre, and some of them brought excuses for not being able to attend the sessions over phone.

Diagram (4.1) Women attending sixth session (postnatal union) and focus group discussions.



4.2.3.2 Description of the focus groups

First focus group interviews (FG1)

This focus group was held on 15th July 2013. Nine women had been invited to attend the sixth session of educational programme and group discussions afterwards. Five women attended but only three of them were ready to stay for focus group discussion (Dlkhosh, Fenk and Kazhal)¹. But Kazhal left the room within the first five minute without anyone noticing. These participants had given birth in the last four to five weeks: Dlkhosh and Fenk gave birth normally, but Kazhal delivered by caesarean section. They were housewives. Two of them were illiterate. Dlkhosh graduated from secondary school. They were all between the ages of 20-30 years. The session lasted for 30 minutes.

Second focus group interviews (FG2)

This focus group was held on 23rd July 2013. Twelve women had been invited to attend the sixth session of educational programme and group discussions afterwards. Seven women attended but only three of them were ready to stay for group discussion (Ahang, Sozyar and Sazan). All these women had given birth in the last three weeks. Ahang and Sozyar gave birth normally, but Sazan delivered by caesarean section. They were housewives and graduated from secondary school. They were all between the ages of 25-37 years. This session lasted 20 minutes.

Third focus group interviews (FG3)

This focus group was held on 10th October 2013 and had the largest number of participants. There were eight out of the thirteen attendees who had been invited, five of

¹ All names are pseudonyms.

² FGn= stand for focus group and its number

³ Intn= stand for interviews with name

them stayed for group discussion. All of the women had given birth within the last 2-5 weeks. Gulalla, Trefa and Naska gave birth normally, but Dlgash and Kner had a caesarean section. They were housewives. Naska and Dlgash were illiterate. Kner graduated from secondary school. Gulalla and Trefa were university graduates. These participants were between the ages of 20-30 years. The session lasted 40 minutes.

Fourth focus group interviews (FG4)

This focus group was held on 20th November 2013. Ten women were invited but eight of them attended the sessions, five of them showed their readiness to attend the group discussions. Sabat excused herself and left the discussion because she had an appointment to do a scan. All the women had given birth within the last 4-5 weeks. Hawar, Shawboo and Shelan gave birth normally, and Sana had a caesarean section. Hawar, Shawboo and Shelan were housewives who had completed both primary and higher secondary school education. Sana was a teacher at a higher secondary school and had graduated from university. All of them were between 25-37 years old. The sessions lasted 25 minutes.

Fifth focus group interviews (FG5)

This focus group was held on 22nd November 2013. Twelve women were invited to attend the session but only five of them turned up. Four of them participated in group discussion. All of the women had given birth in the last 4-5 weeks. They gave birth normally. They were housewives. Bnar and Nishteman completed primary school education while Rezan and Kurda graduated from an institute. All of them were between 30-40 years old. The sessions lasted 20 minutes.

Sixth focus group interviews (an interview)

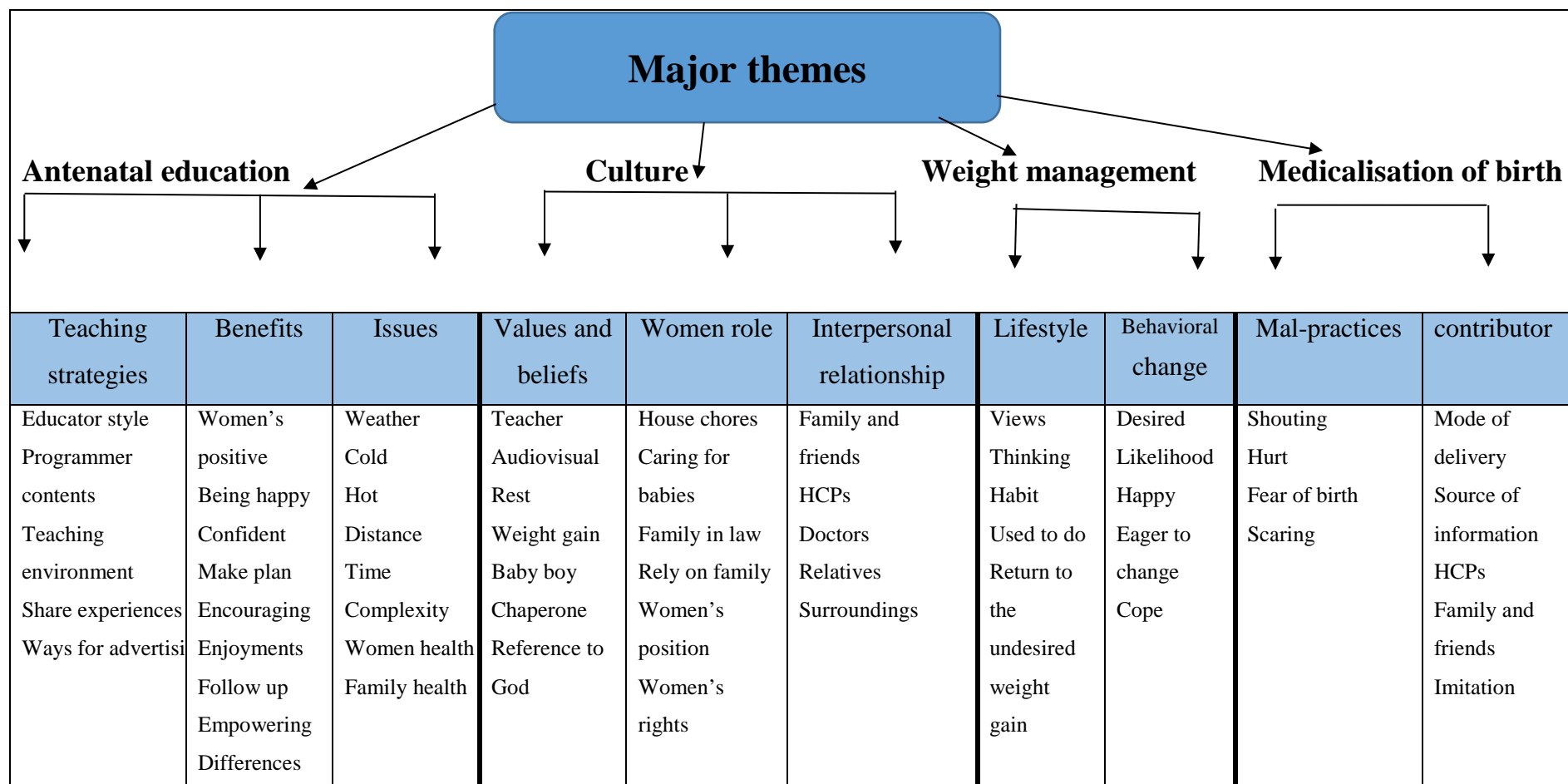
This interview was held on 25th December 2013. Eight women were invited, but only four of them attended session. Only one of them was happy to stay and attend the discussion. Therefore, this

turned into a face to face interview. Banaz had delivered normally in the last six weeks. She was a housewife and a primary school graduate. She was 27 years old. The sessions lasted 15 minutes.

4.2.3.3 Main themes from focus groups and phone interviews

The main themes which emerged during focus group discussion and telephone interviews were "antenatal education", "culture", "weight management", and "medicalisation of birth". The following tables have presented the common themes and sub themes.

Table (4.9). Themes and sub themes of the experiences of women who participated in the focus group and telephone interviews



First themes: Antenatal education (ANE)

The most common sub-themes that emerged from group discussions about antenatal education programme were teaching strategies, benefits and issues with antenatal education.

Teaching strategies

During group discussion women explored teaching strategies including educator's style, programme contents, teaching environments, group discussion, and ways for advertising educational sessions. Most of women were happy with the education style which the educators used during the sessions as the following quotes illustrate:

- Your facial expressions during the session were good. You are not a snobby person (Int, Nishteman) and she mentioned

The tutor's way of teaching and friendly manner has encouraged attending the session regularly and you are not a snobby person. I never saw someone as kind as you because in our country, doctors are usually arrogant (Int, Nishteman)

The teacher's teaching style was so brilliant. Thank you. (Int, Bnar)

In the session which ran on 20th May 2013, *women asked me after the session if I could give them a talk in form of a lecture instead of a discussion, and that they would accept the lecture more than what it was.*

Regarding the contents of the programme, women were impressed and happy, but mostly women were focused on the labour a lot as was stated by most of women.

It's the first time in my life which I know that birth has 4 stages. Oh, and the baby rotates during delivery and they are tired as well. Oh, oh my God (Int, Fenk).

Women were happy about some new education such as

A basket of different fruit was good idea for me (Dlkhosh Fg1, Int, Paeman and Int, Helen

Some participants explained that they found attending sessions fascinating because they shared the same experience with other women.

I felt better when we shared thing with other women in the class. (Int, Shene, Int, Shawboo and Int, Nishteman).

Another sub-theme which was emerged during group discussion was advertising. The women cited the different ways for advertising of the sessions in the future:

If you used different ways for letting women about the programme, you may have more women participating in your programme such as Mass Media, TV and Imam in order to advertise your programme at mosque (Nishteman Fg5) and (Int, Dlveen).

Involving hospital administrative was also stated by women to enhance the attendance rate

If these women were contacted by the hospital, it would be much better rather than being contacted by one person informally. It could be possible that the family prevents these women from attending these sessions. They might say, 'Don't go, it's not worth it. Why didn't they contact our neighbour? She is also pregnant. Does your baby have any heath problem? (Sana Fg4)

She added some points about the issues of teaching strategy which did not fit with what the participants wanted.

Maybe you contacted the women several times, but they didn't think it is important for their health. And they think it's pointless to attend these sessions. (Sana Fg4)

Benefits of the Antenatal Education

In general, women were positive about taking part in educational sessions. By attending the session they felt comfortable, confident and the sessions became complementary to their existing knowledge.

I felt comfortable while I was attending the class. (Int, Nishteman)

Really, swear to GOD, I don't know. All the information which I received from class made me extremely happy because I have pre-knowledge regarding the information you provided. However, scientifically, as I studied Biology, I found your information supportive to my existing knowledge. (Int, Sana)

Attending the sessions was found useful as women stated that they learned to make a plan for themselves.

I found it helpful and especially healthy diet and weight gain within normal. I keep eye on my weight gain and I put a plan for myself (Int, Loona.)

In addition, some women stated that the information and knowledge from education session will remain in their minds.

Most of your advices are still in our mind. we haven't forgotten it (Int, Shawboo, Naska, Bnar, Banaz and Trefa).

Exercise during pregnancy was good. It came to my mind theoretically and practically. (Fenk Fg1)

One thing that is still in my mind is to do things even if you are pregnant. Pregnancy is normal; it is not a disease (Int, Asmar).

Another positive outcome of the sessions which women explored is that they felt happy when they saw that someone was concerned for their health.

It's good to see that I'm being looked after by doctors. That is what I personally noticed from your course. I felt that somebody else is concerned about my health condition. (Int, Nishteman)

Following up the educational papers and elements were also mentioned by participating women. Whereas, some women stated that there was no further need to the educational handouts, because they delivered their babies and felt they didn't need information any more

Until I gave birth, I looked at papers continuously. This time made a difference. (Sana Fg4)

The papers and video were very helpful. I looked at them at home frequently. (Banaz Fg2)
Those papers you gave us were so useful, and I enjoyed them and I often looked at them. (Kner Fg3)

Swear to God, the sessions were very nice, especially the CD which you presented to us. It was so interesting. I watched it many times. (Int, Azheen).

Gawhar added

I was use of all the advised about exercise. It was good, but I forget everything. Do you know why? Because I have a very hyperactive baby boy (Int, Gawhar)

Women showed a hunger for knowledge around birth. This generally and denotes the lack of overall parent education in this setting. As some of them stated that education they received from the session was useful and they were going to transfer/share it with their friend and relatives as Sana suggested:

I still explain this information to my pregnant relatives and friends. I particularly enjoyed this part on stages of labour. That's what I still explain to some of my friends who are lecturers at university even though they haven't got enough knowledge about labour and stages (Sana fg4).

Banaz said likewise.

I explained this to my relatives and friends even though they were not pregnant. (Int, Banaz).

Educational sessions were found as an empowering tool among women as they explored below: in the following

When you gave us the CD about exercise, which helped us to do exercise at home. (Int, Sazan)

On the day of my labour, I was busy with cleaning around the house. I already prepared food. While I was still cleaning the cooker, I felt some pain in my abdomen, but I didn't care (Hawar Fg4)

The key message for me in the session were, how we cope with delivery pain and what we have to do during labour contractions (Sana Fg4)

She added:

I realized that I have to help them to give birth safely and easily, shouting doesn't change anything, I didn't shout a lot. I tried to help my baby, myself and delivery staff. Finally, they thanked me for being patient during the process of delivery even though they don't know me. They appreciated how I organize myself prior to delivery time. (Sana Fg4)

I felt a change in my way of thinking every minute. Before I started to cook, I would think about what a mother must do during labour. Delivering the baby is not just fate. We have to do our best to take care of ourselves. It needs our effort. (Int, Banaz)

Another woman explored that the empowerment which we received from the sessions made a difference as following another woman said she felt empowered by the information that she got from the sessions and this made a difference to her life:

I remember the day of my delivery. I ate a plate of dates and I walked around and I had a warm bath. I found it helpful. I went to delivery room they didn't give me an injection and my pain was so strong and painful. It was so painful, wow I'll never forget. (Laughs) (Gulalla Fg3).

To conclude, women stated that the information which they received during educational sessions remained in their mind and the education had impact on them. They had become

empowered to deliver their babies normally. Furthermore, the participants stated that the information they received during educational sessions had a great impact on them, and this empowered them to deliver their babies normally.

Issues of the Ante Natal education

The group discussions and phone interviews explored the main barriers for women in this region to attend the session. These barriers included physical barriers like the venue, weather and distance from the centres. Women also mentioned time of session, complexity and health of women and family. Finally, the women mentioned other barriers such as difficulties and their health and that of their families.

They felt that the venues of the sessions were too hot in summer and too cold in winter.

My home was far from centre and time was not good because was summer as you know it's too hot (Int, Zerin)

I got operation so the time was winter I could come outside as you know it is not good for my operation (Int, Helen)

The place was good, but my home is far away from this center. Therefore, I couldn't attend the sessions as much. (Shawboo in Fg4)

I am far from the centre. This was the reason for not attending all the sessions. (Int, Lanja)

Participant in group discussions mentioned that:

I feel tired and my home was far from centre (Zerin, Lanja, Azheen, Gawhar and Shene.

The place was not convenient because the room conditions were not as good as they should be. In the winter, it was very cold whereas in the summer it was so hot (Sana in Fg4).

During telephone interviews, other women stated that the time of running the sessions was not favourable to them and thus a barrier to their attending the sessions properly. They preferred the afternoons as illustrated.

If it was afternoon then maybe we could attended because I have to clean and look after my mother-in-law in the morning (Int, Hawzheen).

If it was in the afternoon, it would be better because in the morning we don't have time to go out and we have to look after our kids and prepare foods and clean the house (Int, Muzhda).

The time was not convenient for me. It's better if you changed it to afternoon, because I wake up at 8 and I start to do my home cleaning from 9 to 11. After that, I have to prepare food. (Int, Jehan)

For those women who did not agree to the time of session suggested alternative time for running sessions and they preferred afternoon sessions as a perfect time:

To be honest with you, the session times was not suitable, as you know better than me that Kurdish women have to finish their house chores in the morning. For example, looking after 4-5 kids, preparing them for school and preparing food for our husband is difficult to be managed in the space of few hours. But, if your sessions were running in the afternoon, then it will be more suitable. We could enjoy the session similar to visiting our friends or relative's home (Nishteman Fg5)

Some women explored some of the difficulties that they faced making them unable to attend the morning sessions. This led to low attendance because of their improper commitments.

I couldn't attend because at the morning as you know we have to clean the house and tidy things up and wash (Int, Loona).

Women were busy in the mornings because they use that time to rest and compensate for the night time which was spent with their small children.

Because I have kids at school, I didn't have enough time to come to attend all the sessions (Int, Asmar).

Because in the morning we don't have time to go out and we have to look after our kids and prepare foods and clean the house. (Int, Muzhda).

My husband is a teacher and he has to go to school and my kids were small and I have to look after my mother-in-law as well. (Int, Paeman).

I would usually go to sleep during your morning session times. (Bnar Fg5)

On the other hand, some women were happy with morning sessions because they had fewer responsibilities than other women as explored above.

The time was good because we have enough energy to come to the session. (Gulalla, Trefa, Naska and Dlgash Fg3)

I didn't have any problems because we don't have kids in school (Sazan Fg2).

The time was good usually my husband was at work so I was free to come to sessions (Int, Banaz).

Some of participants mentioned numerous complexities during sessions as pregnant women:
It's also useful to explain about normal sleep duration for pregnant women in your programme. As you aware, most pregnant women in our society have this issue during their pregnancy. For example, when my neighbour's daughter-in-law was pregnant, she used to sleep over 3-4 hours during the day as she thought that sleeping was useful for pregnant women (Bnar Fg5).

What about pregnant women using steps and ladders to go to upstairs at home because we thought that ladders are not safe for women and we have not been using it. Do you think it's all right or not (Naska Fg3)

Likewise Bnar added:

If you can explain normal sleeping duration during pregnancy. They say it is not good for you go to bed too much. Is that right? (Paeman, Bnar Fg5, Sazan Fg2 and Nishteman Fg5)

In addition, participants stated that their level of education was not the same. Some of them had no knowledge regarding healthy lifestyle while others had the knowledge, but they were not sure if it was scientifically proven or not. Consequently, they observed the need and underscored the significance of such types of classes in the region.

Our women do not have the same level of education. (Sana Fg4)

I already had some knowledge, but I wasn't sure whether it was reliable or not. So I felt comfortable and confident while I was attending the class. (Nishteman Fg5).

Another barrier for not attending the sessions regularly was because of their health and that of their family. Others were advised by health care providers to take a rest and limit their movements during pregnancy.

I could not come after birth because I had a Caesarean section for this baby and it is too cold. If I went outside maybe my wound would have become worse and swollen because of cold (Int, Helen).

I could not attend because my condition became worse. I had antenatal bleeding and the doctor advised me not to go out and stay in reclining position (Int, Zerin).

I couldn't attend because my child was in a bad condition and I was busy with him for a month (Int, Azheen).

In this region, most of women get information from family and friends about childbirth.

Kurdish women usually received information from their family, friends and relatives as the following:

After 2-3 hours, I called my sister to see what she said and I told her about my condition (Sana Fg4.)

Sazan added

I am breastfeeding and my family and relatives continuously encourage me to have more and more sweets like tea because they say it will make my milk stronger in quantities (Sazan Fg2).

Other ladies in the same group discussions agreed with Hawar.

Women in general tended to imitate each other a lot regarding mode of delivery, ways for feeding their new-borns and ways of behaving.

Summarising the main findings from the first themes will help future researchers with number of aspects around education especially in this region, including teaching strategies, teacher style, and contents of programme. Benefits and issues with antenatal educational programme were also included. Future researchers who want to design or transfer an educational programme from one country and implementing it in another have to consider the following:

- 1) The educator's style is very important in this society. Individuals prefer persons who are friendly and social. During the sessions, they preferred receiving information from those who sought to clarify issues so as to make them take the information seriously. Therefore, they preferred a more authoritative teaching style and they regarded the educator as a source of information.
- 2) During prenatal educational sessions (directly after delivery), educators have to include sessions involving exercises. As mentioned by the participants, they had inadequate knowledge as to when they should start working and exercising after delivery, especially after a caesarean section. One mother stated that she could not

make it to an educational session and group discussion after delivery, because she had a caesarean section.

- 3) The majority of women showed that they were less knowledgeable regarding the labour stages. This should be taken into consideration for future projects. Working on women's need is high priority for educators who want to design an educational programme.
- 4) Women expressed feelings of comfort and support about the educational sessions as well as support especially when someone asked about their health and showed concern about her. The educator had to be aware that Kurdish women like being asked about their health and this generates a positive response from them.
- 5) Women were satisfied with the venue of the sessions which were held in health care centres. However, some of the participants complained that the centres were far from their homes.
- 6) Kurdistan has four seasons. Summers in Kurdistan are hot, reaching beyond 50 degrees centigrade, and winters are cold with the temperature dropping below zero. Therefore, a conducive and convenient venue for the sessions has to be borne in mind considering the weather patterns in Kurdistan.
- 7) Educators have to be aware of the different educational levels of Kurdish women while designing the educational programmes. These programmes should be inclusive of all levels of education of these participants.
- 8) Women were faced with some difficulties and complexity such as normal sleeping duration during pregnancy.
- 9) Kurdish people respect their teacher a lot. This is discussed in following section in more detail.

Second theme: Culture

Culture emerged as a major theme during focus group discussions. Sub-themes include cultural values and beliefs, women role and interpersonal relationships.

Value and beliefs

When the researcher asked participants about her teaching style during the sessions, the women responded that it was good. During their discussions, it was obvious that culturally teachers are seen as an authority, respected and that the participants do not want to criticise their teachers.

Keep going with it. It was good. No need to add anything more (Ahang, Sozyar and Sazan, Fg.2).

I don't know how I can thank you about what you taught us, I prayed for you many times (Fenk Fg.1).

God bless you. I benefitted so much. Thank you and all time. I prayed for you (Khwnaw, Nishteman Fg.5).

While evaluating the audio visual within a cultural context, the women said during the discussions that they found the CD about physical exercise, which they watched at home, helpful. The CD was given to the participants by the researcher.

It was enjoyable and helpful during the sessions. Visual aids were rated as the most helpful activity especially by illiterate women.

When I did exercises, my kids did them as well. It was fun (Trefa Fg3.)

My husband and I usually watched the video together. It was/gave a nice atmosphere and we saved the video on our laptop (Int, Banaz).

The exercise and the video, I liked it because it was like a video and we like videos so much and it is still in my mind because you can see the video had a very nice atmosphere (Int, Loona).

The Kurdish society values a good rest for pregnant women and patients. Health care providers also encourage women to rest during pregnancy.

As a consequence, during their discussions, they asked educators to focus on rest and sleep for next sessions in their future projects.

In our country we have to stay at home. (Int, Banaz).

For next educational session, sleep duration and pregnancy was a very good point for discussion (Naska Fg3).

In most of the sessions, women mentioned that they wanted to gain weight because in Kurdish culture, it is thought that weight gain during pregnancy is good for their babies' health and gestation. Eating more food during pregnancy is considered as good nutritious provision for their babies.

Babies, especially the boy child, are usually valued in this culture because they regarded as a future generation of their family. The boy child is highly regarded because he will remain in the same family and carry the family name, unlike the girl child. That is why they valued babies a lot even over a pregnant woman's health.

You will kill my baby eventually. You are not going anywhere, and stay at home and look after your baby. I want this little man to be safe. Please listen to me (comment made by Hawar about what he husband said to her at home Fg4).

Some women stated that they had to find a relative to accompany them whenever they want to go to outside to attend her appointments or to do shopping,

My sister had to have time and then she could come with me. This was the reason for not attending all the sessions (Int, Mamz).

The time was not good because my husband was at work nobody can pick me up (Int, Shene)

In Kurdish society, women have to find a relative to accompany them to the sessions and act as a chaperone. When the sessions are held in the afternoon, they can easily find someone, but in the morning, their husbands are at work and their sisters-in-law and sisters were either attending school or university at that moment. Therefore, they were more likely to attend the afternoon sessions than the morning ones.

Reference to God is very common in Kurdish Society as the majority of the population are Moslems. The reason for continuous reference to God is to make people trust them. For example whenever the educator asked some questions the participants opened their responses with “swear to God”.

Swear to God, it was very good but you know whenever someone met me, they would say, “Oh, you have to do CS. (Int, Muzhda).

Swear to God, the sessions were very nice, especially the CD which you presented to us. It was so interesting. I watched it many times (Int, Azheen).

I swear to GOD, of course, especially labour stages and exercise during pregnancy I found helpful. This time I had the baby easily. I said it was an angel who saved me from this critical time (Int, Khwnaw).

Second reason for reference to God is cultural respect to the person. For example when the educator asked women what else they wanted added to the session, they referred to God again as Khwnaw added:

God bless you. I benefitted so much. Thank you and all time. I prayed for you (Khwnaw).

Thirdly, references to God was used to show something they were surprised at.

Many times I told myself you have to have more than one type of fruit. It's the first time in my life which I know that birth has 4 stages. Oh, and the baby rotates during delivery and they are tired as well. Oh, oh my God (Int, Fenk).

Women's role

Kurdish women are culturally used to performing their housework the entire day. They are responsible for caring for other family members like children, husband and their mother-in-law.

In our country we have to stay at home to do cleaning, tidying, washing, cooking and sleeping (Int, Banaz).

I was busy with cleaning around the house. I already prepared food. While I was still cleaning the cooker, I felt some pain in my abdomen, but I didn't care. I carried on cleaning the cooker. I held myself on the cooker. I felt that my labour was about to start but I decided to postpone going to the hospital. I waited at home. Despite all difficulties surrounding me I had to take care of my little daughter (Sana Fg4).

I didn't attend the last 2 sessions because I currently have two children whom I look after. One of them is a one-year-old and the other is old enough to be in private school. I have to help the older one with his school work. And this prevented me from attending all the sessions (Zerin and Gulalla Fg3.)

Participants highlighted that women in Kurdish society have the responsibility and duty of care for children.

Because I have kids at school, I didn't have enough time to come to attend all the sessions (Nishteman Fg5 and Asmar).

I could attend because I have two kids now and I have to look after them (Int, Azheen).

I currently have two children whom I look after. One of them is a one-year-old and the other is old enough to be in private school. I have to help the older one with his school work. And this prevented me from attending all the sessions (Zerin, Asmar, Kner Fg3, Gawhar and Zerin).

In Kurdish culture women usually rely on their families most of the time. They rely on their families before, during and after delivery of their babies for shopping. The mothers leave their babies under the care of their mothers or sisters in case they are going to attend a party, for instance.

I went to my mum after delivery and it's far from the centre so I couldn't come after delivery (Int, Gawhar).

For shopping, we have to find someone to come with us like our husband, mum or sister to buy things but if they don't have time then you have to wait (Int, Banaz).

Women were culturally conditioned to stay quiet and accept whatever the teachers say as was noted in most group discussions. Women responded in affirmative to other participants' contributions during the discussions by saying "I am agree with" or "me too" or "the same".

During focus group discussions women right was emerged as a culture issues in Kurdish society and they were mentioned there is not room for human right as following. During focus group discussions, women's rights emerged as a cultural issue in Kurdish society. They observed that there is no room for human rights as evidenced below:

I want to tell you something; in our country there is no room for respecting a human being. Let alone the women (Int, Nishteman).

Interpersonal relationships

Another sub-theme which emerged during focus group was interpersonal relationships. These included family, friends and relatives in addition to health care providers (doctors and nursing staff). They mentioned that they felt that these interfered with their lives.

In Kurdish society interfering is very obvious to the point where people have to live for others. As mentioned below, the women said they felt interfered by their family, friends, doctors and nursing staff. .

Swear to God, it was very good but you know whenever someone met me, they would say, “Oh, you have to do CS. You cannot give birth easily because you are large and have swelling (Int, Muzhda).

During the group discussion, the women mentioned that family and friends dictated which type of food they (women) should eat all around me, they encourage me to eat more rice and sweet tea to have more milk and I am very stressed because I don’t want to eat more, so it will make me obese which I am not interested in (sighs) (Int, Azheen).

Because I am living with my husband’s family and they told me, “You don’t need to go there. What is the point? Please sit down (Int, Reveen).

Maybe their husband doesn’t allow them or trust them to participate in these sessions (Sana Fg4), (Dlveen and Reveen).

To sum up the cultural theme,

- 1) Kurdish people valued audio visual aids a lot.
- 2) The findings showed that Kurdish society valued rest and the baby’s health over the mother’s health.
- 3) Kurdish women have to find someone to chaperone them in order to leave home.
- 4) Kurdish people refer to God while swearing, as a sign of respect or when they are surprised.

- 5) Educators need to be more aware of women's role in Kurdish society. Women are more likely to be busy in the morning. Afternoons are more useful for visiting and going to appointments. Afternoons are preferred as expressed by the women in this study.
- 6) Women in Kurdish society are a busy people. They have to look after their children in addition to their parents-in-law. Furthermore, they have to do household chores including cleaning the house, preparing food and sending their children to school.
- 7) Kurdish women were relied on their family for doing houses hold, caring kids and going to outside of home. Kurdish women also rely on their families to help them with household chores, caring for their kids and also chaperoning them.
- 8) Women were not allowed to do what they wanted. Instead, husbands and mothers-in-law take responsibility to make decisions for women.

Third theme: weight managements

Weight management was another theme which emerged from the qualitative arm of this study. This included sub-themes of lifestyle and behavioural changes.

Lifestyle

Some women said that their thinking changed over time especially regarding their sense of self and their role during labour as a consequence of the benefits of sessions. In otherward, the women became self-organised.

I changed my life toward a healthy diet and I got used to using a small amount of oil and sugar and it was good for my baby (Trefa Fg3 and Asmar).

Bnar stated that the sessions had a positive impact on her daily life as follows:

I felt that your sessions had an impact on my daily life. It naturally became a habit to get up early in the morning and have a fresh deep breath. I really enjoyed that a lot as you recommended. (Int, Bnar).

When you explained about putting five different fruits in a basket. It became a habit to prepare same basket for my kids (Hawar Fg4) and (Nishteman Fg5.)

One woman during an interview showed her self-reported changes.

About the food, I couldn't control myself because I have an appetite (Int, Mamz).

Women in session 3 in Centre B mentioned the reasons why they could not control their eating. One said:

Kurdish women were unable to control their eating because they were responsible to feed their children so with each child they eat some. After that as in come from religion we are not allowed to throw the food away in rubbish bin we have to eat.

We gave birth and now we don't need education any more. (Laughs) (Ahang and Sozyar Fg2).

On third focus group women stated that they wanted to change their lifestyle but they did not enough time to do physical exercise. They also mentioned that they did not want to become obese, wanted to have a nice feminine face different from those of men.

The women mentioned that they were being blamed for eating a lot yet she did not want to gain weight. Women in Kurdish society feel embarrassed and shame for gaining weight.

I hate to become obese and I want to make myself thin for my next pregnancy to not have a complication of obesity as you advised us (Int, Dlveen).

I was blaming myself and wondering when and how I can lose my weight, especially in my waist which a big issue for me (Bnar Fg5).

I felt a shamed and embarrassed when you asked about our weight gain because obesity is so attached to my mind. I wanted to be thinner once I gave birth. (Sana Fg4).

When I compared my size with other women in the sessions, I felt embarrassed and I realized that I have the largest size within the group. I was blaming myself and wondering when and how I can lose my weight, especially in my waist which a big issues for me (Sana Fg4).

During focus group A1, one woman advised the other women to keep the clothes they wore before their pregnancy and look at them periodically to help them return to their pre-pregnancy size.

Behavioural changes

One woman stated that her experience of delivery was different this time and she expressed her receptiveness to change.

I had three kids, but I struggled with them during delivery, and I faced difficulties during their birth, but this time was so different and easy (Fenk Fg1).

She added:

I was really surprised how my baby was easily born this time. I don't know how. Maybe because my position was very good this time (Fenk Fg1).

This time I had the baby easily. I said it was an angel who saved me from this critical time (Int, Khwnaw).

Some women stated their desired to change.

When you explain about putting five different fruits in a basket. It became a habit to prepare the same kind of basket for my kids (Hawar Fg4).

Some mother presents their likelihood for change.

There is another thing you know that fruits are usually offered in the evening but after your advice, *I got used to having different fruits any time (Int, Asmar).*

In summary, some women mentioned that they changed over time. That means that they are eager to change their lifestyle as seen below:

Labour stages, how we cope with delivery pain and what we have to do during labour contractions (Hawar Fg4).

It was the first time that I know how I can cope with delivery. Wow, so painful (Naska Fg3).

Mothers mentioned that their attitude towards types of certain foods and nutrition changed. My behaviour toward nutrition and what you have to eat during pregnancy has changed and I found it helpful (Nishteman Fg5).

I felt the changes especially the how to prepare food and now I know which type of food is good for us human beings (Hawar Fg4).

I got used to having a very large plate of rice every day, but when you explained that fruits were better than rice for us then I decided to have more fruits and less rice in my meals. Now I cook rice 2-3 per week (Bnar Fg5).

Other women stated that their behaviour changed after they took part in the educational sessions.

In general, I felt that some of my behaviour has been changed over the time (Bnar Fg5).

Other women mentioned that people in this region are eager to change and they are receptive to change.

Nowadays, people are eager to learn and more flexible to accept changes. It is not like old days. People used to refuse this type of education and these kinds of changes (Nishteman Fg.5).

Summary of weight managements

- Women were more likely to change their thinking attitude and behaviour towards choosing healthy food and ways of preparing food.
- Kurdish women say they do not do physical exercise due to inadequate time as they have a variety of responsibilities within the community such as raising children.
- Women wanted to change but they need someone to motivate them. They are eager for change.
- Kurdish women feel embarrassed when they gain weight.

Fourth theme: Medicalisation of birth

Malpractice

During the session women complained about health care providers' practices at the hospital. They even described delivery room as ``butcher shop`` expressing their apprehension to go to the delivery room.

I tried but I have a CS because I was scared from episiotomy (Trefa Fg3).

I can't deliver my baby in a governmental hospital because it is like a butcher shop, I want to go to private one you can have specialized doctors there not junior nurse who don't know anything about delivery (On 10th June 2013, during session discussion in centre C).

Doctors and health providers were purposely scaring women during their treatments and communication. As a consequence, women did not want to come to the hospital again. The researcher had experience as a clinical instructor in delivery room where many women were hurt by staff because they were pregnant.

In the beginning of my pregnancy my private doctors advised me to visit hospital because there were some doctors and staff their which were sacred me (Sana Fg4). Health care

providers were purposely scaring women for some medical intervention in order to make women to stop in bearing child. This was explored in this group discussion.

My doctors told me that my urethra is inside my uterus. After that she said do you know why I scared you? I purposely scared you because I want to force you to have the last CS. They scared me to not have another pregnancy. Why are doctors like that? I don't know why (Fenk Fg1).

Contributor

Contributing HCPs to mode of delivery were also stated by women. Interfering doctors and staff emerged in groups discussions. Most doctors advised women to take rest and not to go out. Sometimes they asked them why they went and intentionally scared them that it was not good for them. However, the women did not have any problem staying at home or to undergo CS when they were pregnant with a boy.

My doctors advised me to go to private hospital which she is working there and she told me you have to do CS. And it is boy, he should be safe (Session 5 in centre A, mentioned).

You know whenever someone came to visit me, they would say, “Oh, you have to do CS. you cannot get birth easily because you are large and have swelling (Muzhda and Dlveen).

In summary:

- Women were frightened by health care providers in order to deliver their baby at private hospitals. This is in the doctor's interest.
- Health care providers did not handle well the mothers especially during delivery. That is why most mothers referred to the delivery room as a “butcher shop”.
- Kurdish women received medical information from other women such as their sisters, cousins and friends. Therefore the educator equipped them with scientific knowledge.

- Kurdish women were imitated to their family and friends a lot especially during pregnancy and birth.

4.3 Linking the quantitative and qualitative approach

The study findings captured from the quantitative approach are discussed according to the study aims and objectives. The discussion included pregnancy outcomes among study groups as main objectives of the study maternal, labour and neonatal outcomes. In the qualitative approach, the researcher tried to explore women's experiences regarding the educational programme and pregnancy outcomes. In the discussion chapter, the quantitative and qualitative results are discussed separately.

Qualitative data helped to provide context to the unexpected outcomes from the quantitative results and helped explain the challenges of engagement in education programme in this cultural context, but how women are hungry for information, not just on managing gestational weight gain but in being empowered for their childbirth experience.

Respondent rate

Regarding the first questionnaire, the response rate was good, because the researcher was available to answer the participants' requests for more details on the questions while they were filling them in. The despondence rate of the second questionnaire was low at the beginning of the data collection period, because of the fluctuations when women delivered their babies. The researcher missed some deliveries. The participation rate improved after the researcher conducted some interviews over phone to fill in the questionnaire for women who missed filling it in themselves. The pregnant women informed the researcher immediately when their labour started. The researcher collected information regarding the participants' mode of delivery, birth weight and neonatal

outcomes from the women, their relatives and HCPs who conducted delivery. It was challenging for the researcher to use different people to provide valid data because they read, interpreted and responded to the questions how they understood them (Wyse et al., 2014). The researcher had to apply caution when dealing with data during analysis and the interpretation process.

4.4 Summary for chapter

This chapter dealt with research findings for the quantitative and qualitative data collection methods. The researcher included all descriptive, inferential statistical tests, finding from the focus group and phone interviews and the discussions in addition to field notes. The main aims of using above methods in this chapter were to answer the question whether an educational programme on pregnancy outcomes among obese women in Kurdistan region is feasible, and to explore women's experiences toward the educational programme and their perceived benefits on pregnancy outcomes. In the next chapter, the researcher contextualises the research findings within the existing literature to discuss the research questions in more details.

CHAPTER FIVE DISCUSSION

5.1 Introduction of the chapter

This chapter presents the interpretation and discussion of the key findings of this study and places them in to the context of the existing literature in the field. This chapter also presents a critical analysis of the applied methodology, the study design, applied tools for data collection and analysis.

5.2 Revisiting the aims of the current study

The first aim of this study was to assess the feasibility and acceptability of implementing a randomised controlled trial to assess the effectiveness of an educational programme on the pregnancy outcomes of firstly normal weight pregnant women, second obese pregnant women without educational programme intervention and third, obese pregnant women with intervention. All three groups of women were attending primary health centres in a large city in the Kurdistan region of Iraq. Pregnancy outcomes were identified among study sample and the results compared for differences. The findings show that there were less cases of gestational diabetes among obese women who attended the educational programme that instructed them on healthy diet and exercise during pregnancy, compared to those women who did not attend (control group). Such an observation is rare in a context such as Iraq. There was no indication that other pregnancy outcomes were affected by the programme. As a result, the research included the additional aim to explore obese women`s experiences of an educational programme and their perception on its impact on pregnancy outcomes to identify and explore the reasons behind the unexpected outcomes. The following sections discuss the research aims and questions in the light of the research findings and the available evidence.

This chapter is divided according to the themes that emerged during the study: pregnancy outcomes, useful educational strategies to be considered while organising educational sessions, cultural views, weight management and medicalization. As already mentioned, attendees to the educational programme registered a positive pregnancy outcome with regard to a lower number of gestational diabetes mellitus (GDM) compared to those who did not attend. The result suggests that pregnancy outcomes may be improved by attending educational programmes. Other pregnancy outcomes that are discussed are PIH, IOL, episiotomy, birth weight, and Apgar score. In these cases however there were no positive correlations for these outcomes.

The chapter further discusses factors and strategies that should be considered while designing educational programmes for communities. More specifically, it discusses the trials and pitfalls for transferring an educational programme from the UK to the Kurdistan region/Iraq. In addition, common socio-cultural issues in Kurdistan region, which constituted a barrier, preventing the women from attending the sessions, are discussed. Subsequently, topics such as changing lifestyles and its associated challenges, cultural views on obesity, the power of healthcare providers over the pregnant women in Kurdistan region are discussed.

The pregnancy outcomes that were studied in this research include maternal, labour and neonatal outcomes. Maternal outcomes include weight gain during pregnancy, PIH, gestational diabetes and gestational age at onset of labour. The labour outcomes include the mode of delivery, induction of labour, episiotomy and length of labour. Finally, the neonatal outcomes investigated included first minutes Apgar score, neonatal birth weight, still birth and new-born admission to the ICU and congenital abnormalities.

Obesity is regarded as a risk factor for pregnant women; studies have shown that obesity can have adverse effects on pregnancy outcomes (Chu et al 2009) indicated that obesity is regarded as a risk factor during pregnancy. This thesis is a contribution to the existing literature in this field. The next section compares the findings of the research with the existing literature with respect to the effect of educational programmes on pregnancy outcome among the baseline group, and the control and intervention group of obese pregnant women.

5.3 Pregnancy outcomes and educational programme

5.3.1 Positive pregnancy outcomes.

Table 4.6 shows that the prevalence of GDM among normal weight women was 5.4%, whereas 12.3% among obese pregnant women in the control group developed GDM. Unlike Avcia et al (2015), who conducted an observational study on 931 pregnant women in Turkey to investigate the efficacy of obesity on foetal and maternal outcomes in different BMI categorizes. Their study found that gestational diabetes occurred more often among women with a BMI of 30 or above. Torloni et al (2009) conducted a systematic review which included 59 cohort and 11 case-controls studies with the aim to assess and quantify the risk for gestational diabetes mellitus (GDM) according to pre-pregnancy maternal body mass index (BMI). Their results showed that the prevalence of GDM increased by 0.92 for every 1 kg/m² increase in BMI. Torloni et al (2009) concluded that the risk of GDM is positively associated with the pre-pregnancy BMI. It should be noted that the studies included in Torloni et al (2009) review were methodologically inconsistent and compromised in quality (e.g. unpublished work). The sample size of this feasibility study was not statistically powered to detect these changes

In addition; the baseline group of the study (normal weight women) characteristics such as age, parity, educational level were different than women in obese control group.

In line with the aim a trend towards reduction in GDM was observed in women who participated in the intervention compared to those who declined participation (.3% while the figure was 12.5% for the control group. This positive trend towards a healthier birth outcome could be due to women who participated in the study may have been more motivated in adapting a healthy lifestyle than the comparison group.

Following that, educational programmes that promote a healthy diet and physical exercise during pregnancy can have a positive effect to decrease GDM cases. This finding is an original contribution to knowledge in this field, highlighting the benefit of antenatal education in reducing the risk of GDM in obese women. In the contrast with previous randomised controlled trials about the effect of a behavioural intervention in obese pregnant women, the UPBEAT study (2014), which included 1555 women with the aim to investigate whether a complex intervention could address diet and physical activity to reduce the incidence of gestational diabetes. In the study, gestational diabetes did not differ between groups, despite improvements in some maternal secondary outcomes in the intervention group, including reduced dietary glycaemic load and gestational weight gain (Poston et al., 2014). Therefore, the author concluded that the behavioural intervention addressing diet and physical activity in women with obesity during pregnancy is not adequate to prevent gestational diabetes. Moreover, the findings of the current study for the relationship between prevalence of GDM and weight gain during pregnancy show that weight gain in the intervention group was around 1kg less than that of the control group despite the low attendance rate (12.48%) (See table 4.6). The indication here is that the intervention was useful in helping the women to control their

weight gain during pregnancy which in turn might have decreased their chances for developing GDM. The systematic review conducted by Thangratinam (2012), which included 44 relevant randomized controlled trials (7278 women) and evaluated three categories of interventions showed similar findings: diet, physical activity, and a mixed approach suggested that interventions based on diet in pregnancy would reduce the gestational weight gain by 4 kg, on average, compared with 0.7 kg and 1.0 kg with physical activity and a mixed approach, respectively. Dietary interventions were most effective in reducing complications such as gestational diabetes. This result adds to the body of literatures around effect of weight gain and prevalence of GDM. Therefore, a larger randomised control trial with larger sample size is recommended in Kurdistan. This finding leads the researcher to the conclusion that motivating women towards a healthy diet and simple exercise is crucial for women during pregnancy. The study also suggests that even a not too detailed educational programme can make some difference to pregnancy outcomes. This is in agreement with a review by Oteng-Ntim et al. (2012) which included thirteen randomised and six non-randomised clinical trials in metaanalysis. The review investigated the efficacy of antenatal dietary and lifestyle interventions among overweight and obese women on their maternal and perinatal outcomes. Oteng-Ntim and his associates found a reduction in the prevalence of gestational diabetes (six randomised clinical trials; $n = 1,011$; odds ratio 0.80 (95% confidence interval 0.58 to 1.10)). The authors concluded that antenatal lifestyle intervention is associated with restricted gestational weight gain and a trend towards a reduced prevalence of gestational diabetes in the overweight and obese population. A limitation of this review is that most of the studies were conducted in developed countries such as USA, UK, Australia, Finland, and Denmark, which cannot be regarded as a

representative of developing countries such as Kurdistan region of Iraq. In addition, the review findings need to be interpreted with caution as the available studies were of poor to medium quality as they used Cochrane risk of bias tool for assessing the study. The findings of this study also contrast the results of a systematic review conducted by Tieu et al (2010), which included three randomized control trials consisting of 107 pregnant women. Tieu et al (2010) concluded that the effect of dietary advices during pregnancy to prevent gestational diabetes resulted in high heterogeneity between trials in most results. One of the obvious limitations of their review is the small sample size of 107 participants. The contrast between the results of this thesis and the available literature may be due to a couple of reasons. One likely explanation may be the sample size. The sample size did not give statistical power so conducting a national survey to investigate the prevalence of GDM among different BMI categorised is recommended with a larger sample size. Another possible reason could be the local diet. In Kurdistan, people consume a lot of sugar, such as in their tea, in form of sweets and chocolates. The recent harsh economic situation has also resulted in more people living a sedentary lifestyle. People in this region are therefore at risk of acquiring chronic diseases including diabetes mellitus. The Ministry of Health in Erbil governorate announced in 2010 that more than 1070 people were diagnosed with diabetes in Kurdistan region, with a higher prevalence among women than men, among a population of around five million (Dooski, 2011). Additionally, an analysis of the relationship between ethnicity and obesity may shed more light on this issue. Ramos and Caughey (2005), in their retrospective study on the interrelationship between ethnicity and obesity and its effect on obstetric outcomes, concluded that Asian and Latina women are at higher risk of developing gestational diabetes than Obese Caucasian women. Their findings showed that ethnicity could play

a role in the development of gestational diabetes among obese women during pregnancy. This study could be repeated using the established Asian BMI classification, which may be more representative of the population being studied. However this needs to be used with caution due to the recommendation that it be revised (Misra 2015). Another possible explanation for this result is the link between gestational diabetes and the amount of gestational weight gain during pregnancy. A case-control study on 1145 pregnant women in California by Hedderson, Gunderson and Ferrara (2010) investigated the relationship between gestational weight gain and the associated risk of GDM. The authors concluded that excessive amounts of gestational weight gain during pregnancy may increase the risk of developing GDM especially in early pregnancy. To support that, in current study most of the normal weight pregnant women who participated in the study gained more weight than the other groups of women (control and intervention). However, we cannot compare these groups because of confounding variable, so it is regarded as a limitation for this study and for next trial this should be in mind. This suppose the findings of Hedderson and his colleagues which proposed that normal weight women are at the risk of developing GDM compared with the obese group. Even though Hedderson et al.'s (2010) sample size was representative of the population, the study had some limitations. The pre-pregnancy weight was reported for some of the samples thus introducing a source of error on the accuracy of the collected data. There were no weight records for approximately 15% of the participants in Henderson's study.

5.3.2 Negative pregnancy outcomes

The common pregnancy outcomes which were investigated in the current study are discussed in this section. These include GWG, PIH, GA at onset of labour, the mode of delivery including the rate of NVD, CS, IOL and episiotomy, neonatal outcomes

including birth weight, Macrosomia, admitting new-born to NICU, birth defects and stillbirth.

5.3.2.1 Maternal outcomes

The data indicated differences between control group and baseline group. However, the data must be interpreted with caution since normal weight and control group were not matched and evidence suggests that gestational weight gain varies between BMI groups (Yaktine et al, 2009; Vader et al. 2007). As was shown in table 4.6, obese pregnant women in the control group gained on average 10.99 kg gestational weight compared with the normal weight pregnant women who gained 13.3 kg on average. Similarly, Yaktine et al (2009) reported the mean weight gain among obese women during pregnancy was less than that of the normal weight women, due to the fact that obese women already have sufficient storage energy for their pregnancy and their body gains less amount of weight when compared to normal weight women.

The same table (4.6) shows that the average of weight gains during pregnancy among intervention and control group were almost the same. In a systematic review conducted by Dodd et al (2010) which included thirteen clinical trials (n=743 overweight and obese pregnant women) the restricted gestational weight gain during pregnancy could not be limited through intervention (Dodd et al, 2010). The quality of the methodology of some of the included studies was poor, with unclear allocation concealment in some included trials, unclear methods of generating randomisation sequences in some studies and loss to follow up of more than 20% in some trials. Moreover, a randomised controlled trial conducted by Althuisen et al (2012) evaluated the effects of a counselling intervention on excessive weight gain during pregnancy and postpartum weight retention in midwifery practices in the Netherlands. The authors concluded that the lifestyle counselling

intervention evaluated in this study did not have an effect on excessive weight gain. The main limitation of Althuisen's (2012) study was that it did not measure the participating women's BMI; they relied instead on self-reported pre-pregnancy weights.

In contrast, there are studies which have argued that interventions can result in decreased GWG for obese pregnant women (Claesson et al., 2011; Vinter et al., 2011; Guelinckx et al., 2010 and Wolff et al., 2008). Vinter et al (2011) conducted a Lifestyle in Pregnancy (LiP) study, a randomised controlled trial of lifestyle intervention in 360 obese pregnant women to assess the effect of the LiP on gestational weight gain (GWG) and obstetric outcomes. The intervention included dietary guidance, free membership in fitness centres, physical training, and personal coaching. The authors concluded that the intervention resulted in limited GWG in obese pregnant women. Overall, obstetric outcomes were similar in the two groups. Similarly, a systematic review by Oteng-Ntim, et al. (2012) which included thirteen randomised clinical trials of lifestyle interventions in overweight and obese pregnant women ($n = 1228$), concluded that there was a modest influence on GWG among participants (-2.21 kg; 95% confidence interval (CI) -2.86 kg to -1.59 kg). The quality of the studies in this review was a major limitation. Moreover, a systematic review and meta-analysis by Thangaratinam et al. (2012) reported a reduction in GWG (1.42 kg reduction) across 44 clinical trials (5481 women) that offered healthy lifestyle interventions during pregnancy across all BMI ranges. The largest reduction in weight gain was observed with dietary intervention. However, the results of the healthy lifestyle intervention programme implemented in the current study showed no effect on the amount of gestational weight gain based on the IOM range provided for each BMI category. This could be due to the low attendance rate among those women randomized to attend the programme. The low turnout may be because of traditional and conservative

role women occupied in Kurdistan (will also be discussed in the following section of this chapter). A qualitative study by Titaley et al (2010) explored why some women attended antenatal and postnatal care services in Indonesia. Twenty focus group discussions (FGDs) and 165 in-depth interviews were carried out involving a total of 295 respondents. The authors found the main reasons for non-attendance was due to financial difficulty, limited availability of health services, distances from health facilities and poor road conditions.

Moreover, a systematic review by Campbell et al (2009) on dietary and /or physical activity interventions for weight management in pregnancy listed some external factors which influenced the effectiveness of the intervention (such as content, delivery, setting, who is delivering the intervention, intensity, duration and target setting). In the current research, the teaching strategy and style used to deliver the educational programme was found not to be helpful in this context and this will be discussed in the qualitative part in the following sections.

The Institute of Medicine (2009) indicates that attention and support from women`s health care providers, family and community is necessary for achieving the recommended weight gain during pregnancy (IOM, 2009). Another factor which may explain the inconsistency is the pregnant women`s view toward gestational weight gain which is valued in this region. In Kurdistan, women, especially pregnant women, are encouraged to eat more and gain more weight. As was stated by UK based qualitative research, women may change their eating behaviours during pregnancy due to cravings, increased hunger and to relieve nausea. A study by Johnson et al (2004) found that women legitimate overeating by the fact of being pregnant and that eating more is “part of being pregnant”. Therefore, qualitative research on obese women`s experiences towards weight

gain during pregnancy is recommended to explore their experiences in more detail and also explain the socio-cultural barriers which interplay with women's attitude and practices toward monitoring their self for excessive weight gain during pregnancy. As stated before, the current study found that the rate of GDM was lower among the women who received the educational programme. This can be interpreted that the women that participated in the educational programme learnt more about the impact of diet on pregnancy, hence reducing some element such as sugar in their diet compared to the control group. This could explain the lack of differences found in the amount of weight gain between the control and intervention group. Perhaps a more extensive and lengthy educational programme would achieve a long-term behaviour change. The research findings (table 4.6) show that the prevalence of PIH was 14% in normal weight women, 17% among obese women in the control group and 14% in intervention group of women. This is in line with Basu et al (2010), who investigated the prevalence of PIH among women and their maternal outcomes in South Africa and reported no link between PIH and BMI groups. Instead they found that PIH might be linked to other causal factors (i.e. age of mother and mother's family history) in South Africa. However, the current finding is not consistent with the results of several studies which were conducted in different countries. For example, a case-control study conducted in a hospital in south of Tehran/Iran by Kazemian et al. (2014) identified maternal obesity as a risk factor for developing gestational hypertension. They found that women with BMI above 30 kg/m² are nearly four to five times at risk of developing gestational hypertension compared to pregnant women with normal BMI (20-25 kg/m²) (Kazemian et al., 2014). The main limitation of Kazemian et al.'s (2014) study is related to their study design. They designed a case control study, in which the relationship between cause and effect is not

distinguished. In addition, the study didn't measure the women's BMI; they relied instead on self-reported pre-pregnancy weights. Similar finding were itemized in different published studies (such as Ehrental et al., 2011; Yogev and Catalano, 2009), where the PIH can be seen to occur more frequently among obese pregnant women than normal weight women. The findings of Robinson et al (2005) also suggest that pregnant women have greater chance of PIH if they are obese.

In the same table showed that the prevalence of PIH were almost the same among women in intervention group and those in control group. The indication is that the intervention had not affected the prevalence of PIH among the women who received the programme. This result is in contrast with the result of a systematic review conducted by Thangaratinam et al (2012), which showed that lifestyle intervention for obese pregnant women reduced the incidence of PIH. However, Thangaratinam et al (2012) considered that the quality of evidence which was used in their reviews was very low. Conversely, Dodd et al (2014) implied that antenatal advice will not improve pregnancy outcomes such as PIH. The main limitation of their trial were the generalizability and external validity of the findings, the population being predominantly white and of high social disadvantage, with 60% of eligible women declining to participate, reflecting both a lack of interest and time because of other commitments. The main problems of up to date literature regarding trials is compliance among participants. Similarly Dodd et al (2014) indicated that with the same direction. A trial by Vinter et al. (2011) reported higher rates of attendance than were achieved in Dodd et al (2014) and current research. In conclusion, the attendance rate for this research was not good. As a result, only little differences were found. The small sample size of this study will possibly have constituted a limitation hence conducting a quantitative research with larger sample size is recommended.

The results of the study (table 4.6) show that the prevalence of preterm was almost the same among study groups. This agrees with the results of a systematic review conducted by Lambert and Germain, (2010). The review which included 84 studies investigated the relationship between preterm birth and overweight and obesity women in singleton pregnancies in developing and developed countries. It found no differences between obese and overweight women compared to normal weight women regarding their risk to preterm birth. However there appears to be some contradiction in the literature regarding GA at onset of labour and maternal obesity as studies report differing results. For example some studies indicate that obese women are at increased risk of delivering preterm babies (Driul et al., 2008; Smith et al., 2008; Baeten et al., 2001) while other studies, such as Sebire et al (2001) reported a decrease in the number of preterm birth among obese women.

Same table have showed that the prevalence of pre-term birth among new-born was no different between the women who received the education programme and those who did not. Similarly, Phelan et al (2011) and Thornton et al (2009) found that intervention did not significantly reduce the risk of preterm birth among their study participants. However, the small sample size in the current study is acknowledged as a limitation. In addition, the absence of a medical chart and follow up during pregnancy in Kurdistan region constituted a barrier for the collection of valid data regarding GA at the onset of labour especially among the control group. The data for this group (control) was collected over the phone whereas that of the intervention group was collected during the educational sessions. Also, the researcher had to rely on Ultra Sound (US) to calculate the women`s GA as the Kurdish women did not know their Last Menstrual Period (LMP) correctly because their educational levels were low as stated in the introduction chapter. This data

should therefore be treated with caution. Overall, the indication is that the educational programme may have influenced the women's choices over opting for caesarean section, having received education on normal pregnancy duration as well as the benefits and limitations of caesarean section. Elective delivery has been identified as one of the causes of preterm (Simmons et al., 2010). Educational programmes which address the normal pregnancy duration may be useful in helping women make informed choices with respect to undergoing inducing labour or caesarean section. During the educational session carried out in the current study, the women were encouraged to deliver their babies naturally because of the associated physiological advantages. However, the cases of caesarean section among women who attended the educational programme were similar to those who did not attend. This is in contrast with the findings of Barakat et al (2012). The study included 290 participants who attended a structured educational programme on exercise during pregnancy. The results indicate that regular exercise during pregnancy reduced the number of caesarean sections and forceps delivery. A retrospective study in Italy included 1893 mothers to evaluate whether participation in antenatal classes during pregnancy reduces the rate of caesarean delivery in southern Italy (Cantone et al. 2016). The authors showed moderate efficacy of antenatal classes, which reduced the occurrence of caesarean section by about 10%. However, the caesarean section rate remained high. The limitation of this study was that the women's BMI was not stated. Regarding the mode of delivery, same table in the result chapter shows that normal weight women were more likely to deliver their babies normally (61.3%) whereas obese women were more likely to deliver their babies through caesarean section (60.2% for the control group and 57.7% for the intervention group). There is a lot of support for this finding in literature. Barau et al (2006) found that obese women are at increased risk for caesarean section.

Similarly, Chu et al (2007) stressed that obesity in pregnancy is associated with an increased rate of elective and emergency caesarean section. It has been suggested that it is the combination of other variables with obesity that is linked to pregnancy outcomes like CS and not just obesity alone.

Sheiner et al (2004) identified gestational diabetes and preeclampsia as additional confounder variables which in addition to obesity can lead to pregnancy outcomes like CS. Similarly, Weiss et al (2004) suggested that variables such as PIH, GDM and macrosomia can lead to increased numbers of CS among women. The study concluded that obesity during pregnancy is an independent risk factor for CS. On the other hand, Kominiarek et al (2010) showed the rate of CS to be three times higher after controlling for parity and prior CS. Therefore, prior CS in addition to maternal obesity is likely to increase the chances for having CS in the future. A joint guideline between CMAA/RCOG (YEAR), suggested that obesity alone during pregnancy is not an indication for induction of labour, women should have other obstetric and medical indications such as PIH and previous CS. Castro and Avina (2002) assert that performance of CS is linked to several explanations including failure in induction of labour, macrosomia (baby more than 4000g in weight), and CPD (condition when the baby's head is bigger than mother's pelvic size). A study by Dietl (2005) supported and confirmed this relationship. Table (4.6) shows that obese women in the control group (34.15%) were more likely to undergo elective CS whereas; intervention group (34.4%) had emergency CS. There are different reasons which could explain the significant number of CS cases. Firstly, participants in the intervention group did not attend the exercise session properly due to family commitments and other responsibilities. In addition, they believed their daily house chores kept them active enough and hence saw no need for any additional exercise

sessions. Secondly, CS in this region is viewed as a kind of fashion and wealth statement. Women opted for CS as an opportunity to show off. It is viewed as a safe procedure for the child and as a sign of affection toward women by their spouse.

There is also a patriarchal element in that CS is chosen if the sex of the baby has been determined to be male. Also, previous experiences associated with painful childbirth maybe another reason for the significant numbers of women who opt for CS. A document by WHO (2017) regarding quality of care reported that women have a right to effective care including effective communication, emotional support, respect and preservation of dignity, access to professional personnel, and access to essential physical resources. However, women in this region are not provided with such quality of care irrespective of their choice of child delivery. In addition, delivering the baby at a known date might be another reason for increasing CS. As stated by Bettles et al (2007), maternal demand has been regarded as a significant leading factor driving increases in CS rates. Another explanation for the increasing number of CS among obese women has to do with previous CS among multiparous which is a leading factor for increased numbers of CS among obese women. In addition, health care practitioners usually influence women to opt for CS. It is common for obese women to be discouraged from undergoing normal delivery and encouraged to undergo CS. One final reason is the very low awareness regarding the complications of CS in Kurdistan. As shown in findings, the number of women who elected for CS to be carried out on them was higher for those who did not attend the educational programme (control group) compared to the intervention group. The indication is that the educational programme was useful in influencing the choices of some of the attendees. This is understandable given that CS and its associated complications was a major topic at the educational session. Therefore, women in the

intervention group were less likely to deliver their babies by elective CS unlike the control group who were more likely to deliver by elective CS.

The implication is that the women in the intervention group learnt how to cope with labour and wait for normal vaginal delivery from the educational session. Thus, re-enforcing the notion that educational programmes which address the normal pregnancy duration may be useful in helping women make informed choices with respect to undergoing inducing labour or caesarean section. Table 4.6 shows that normal weight women were more likely to deliver their babies normally. It also shows there were higher numbers of cases of induced labour and episiotomy for the normal weight women. This finding is in contrast to an observational cohort study by Ellekjaer et al (2017), which included 1885 women and stated that the proportion of induced births increased with increasing BMI. Similar result were seen in a study by Arrowsmith, Wray, & Quenby, (2011). The study comprised 29,224 deliveries over a period of four years in which time 35% obese women were induced during their delivery whereas 22% normal weight women were induced. The differences between available literature and the fact in Kurdistan region is related to the quality of care services which is provided within maternity services especially delivery room. Pregnant women were not allowed by their family and HCPs to make decision on her mode of delivery (this will discuss in more detail in following section and medicalization of birth in qualitative part.).

A clinical explanation for the contrast is that the normal weight women in this research were mostly young. In fact findings show that most of the women in the baseline group (normal weight women) were primiparous so their chances to normal delivery were higher when compared to obese group. It is therefore likely that health care providers, physicians and indeed family members would persuade the pregnant woman to undergo

normal delivery as the general belief is that if the first baby is born normally then subsequent pregnancies will end in normal deliveries whereas if the first baby is delivered by CS then the women have to do CS for subsequent pregnancies. This being the case, the results for induced labour and episiotomy will have to be treated with a bit of caution. An important recommendation will be for further studies comparing results for similar groups to be carried out as no such comparisons were made in this study. The research findings have shown that the prevalence of IOL and rate of episiotomy were similar among women in both obese group (intervention and control). This suggests that the educational programme made no difference. This may be due to the handling of the delivery process by nurses and midwives who sometimes make decisions that are not scientific, or evidence based. Lack of knowledge on how pregnant women should push and the appropriate positions to take during delivery (childbirth) may have contributed to some cases of episiotomy. Ahmed's (2014) investigation on midwives' clinical reasons for performing episiotomy in Kurdistan concluded that most of the reasons given by the midwives were not evidence based and mostly related to the midwives age, years of experience and level of education. According to the article, 50.9% of the midwives stated that they conducted episiotomy because they wanted to prevent the women from having a perineal tear, as they are more difficult to repair. It is likely thus that lack of knowledge on appropriate positions may have contributed to the findings of this study. The evidence is that proper position during delivery would decrease the prevalence of episiotomy among women (Carroli and Mignini 2009). On length of labour, the results (table 4.6) show there were no differences between the groups. This is in contrast with the study by Doherty and Norwitz (2008) who found that obese women have prolonged labour than normal weight women. Many authors have speculated that this phenomenon may be

related to the added soft-tissue deposits in the pelvis of obese women, which coupled with a larger foetus, might necessitate more time and stronger contraction to progress through labour (Vahratian et al., 2005). Similarly, a study conducted by Siega-Riz and Laraia (2006) discovered that the active phase of labour was prolonged among obese nulliparous women compared to normal weight nulliparous women (Siega-Riz et al., 2006), the median active phase for normal weight women was 6.2 hours compared to 7.9 hours among obese women, the investigators stated that this differences remained even after controlling for confounding variables such as induction status and epidural use. So the literature suggests that prolonged labour is common among obese pregnant women. However, there is little evidence with respect to reducing the length of labour through intervention programmes. Many studies recommend further research on this issue. Having organised an educational programme for obese women in the current study, the finding of this research is that the programme had no effect on the length of labour of the women. This is similar to the findings of Artieta-Pinedo et al., 2010, who conducted a prospective observational study on the benefit of antenatal education on the childbirth process. Artieta-Pinedo et al. (2010) concluded that there was no association between antenatal education and the childbirth process. Prolonged labour may also be affected by other confounder variables like older age women, mal-presentation like shoulder dystocia (Øverland et al., 2014), which were not factored into this study. This may well explain the outcome. Another reason is that the attendance rate to educational programme was very low. So the opportunity to learn from the educational programme was not fully harnessed. In several cases the information about labour and neonatal outcomes were collected over the phone by asking the women`s relatives and birth conducted by HCPs. Thus there may be questions as to the extent of the validity of the collected data. Involving

health care providers in research process for future studies is therefore recommended as a measure to help with data collection otherwise researchers will have to be physically present during data collection. However, this may not address subjectivity completely. For example, the estimation of length of labour is often subjective. Even if conducted by health care professionals there is a degree of subjectivity in this outcome due to variations in the diagnosis of onset of labour (Hanley et al., 2016)

5.3.2.2 Neonatal outcomes

Table 4.6 shows that the average of birth weight among the study sample were similar. In contrast, Ehrenberg et al. (2004) found that obesity is independently associated with the prevalence of birth weight leading to macrosomia. The study reviewed 12,950 pregnancies. Similarly, in a case control comparative study conducted by Alrubae and Jafer (2010) in Al-Basra Maternity and child hospital located in the Southern part of Iraq; the number of macrosomia cases which was seen among obese women was not so different than that seen among the control women. The little difference as reported in the Alrubae and Jafer study was due to the small sample size and as well as the fact that the duration of the study was short. Also the women in the intervention group were older and had had more children compared to the control group (Alrubae and Jafer, 2010). A systematic review by Dodd et al. (2010), which included nine randomised trials reported that macrosomia was seen more among obese women than in normal weight women and that the designed educational programme affected birth weight (Dodd et al., 2010). Table 4.6 shows that birth weight among women intervention group were more similar to control group. The LIMIT randomised trial study by Dodd et al (2014), which included 2212 women with a singleton pregnancy and a BMI ≥ 25 to determine the effect of antenatal dietary and lifestyle interventions on health outcomes in overweight and obese

pregnant women had similar outcomes. Women were provided with antenatal lifestyle advice. The authors concluded that the antenatal lifestyle advice used in this study did not reduce the risk of delivering a baby weighing above the 90th centile for gestational age. The study included overweight women within the participants. Once again, the results of the birth weight for the current study will have to be taken with some caution. A poor practise in the weighing procedure is common in Kurdistan. For example, some women who gave birth in the hospitals had their babies weighed by hospital staff with little or no knowledge in nursing practices. Whilst there are cases of private midwives who just guess the weight of the baby by holding them. In other cases, the weight of the baby may be taken in a hurry, different weighing instruments may be used instead of using the same instrument thereby increasing the chances for error in measurement.

Regarding other neonatal outcomes like Apgar score, admitting new babies to NICU, prevalence of birth defect and still birth, the findings show there were similar among women in this study (obese without intervention and obese with intervention). The feasibility study was not statistically powered to detect these changes and the baseline group (normal weight women) characteristics like age, parity, educational level were different than women in obese control group.

The findings agree with the randomized control study conducted by Kashanian et al (2010) who found that antenatal education classes had no effect on the Apgar score for the women who received the classes compared with those who did not. A limitation of Kashanian et al. (2010) study was the sample size which was 100 for two groups (50 interventions and 50 non-interventions). On the other hand, Galtier-Dereure (2000) reported a different finding where in the babies of obese pregnant women had lower Apgar scores. The quality of the results of the current study may have been affected by

poor practise procedures among health care providers who render care at delivery. For instance, the researcher while teaching the nurses at the delivery room observed that some of the HCPs were careless while taking blood pressure measurements and Apgar score. Small sample size may have also affected the quality of the results. Further studies with larger sample size are thus recommended. The results for admitting newborn babies to NICU (presented in table 4.6) show no statistical significant differences among women in the different groups. This is opposite to the findings of Bhattacharya et al (2007) which indicated that obesity is associated with an increased risk for neonatal complication such as admitting newborn babies to NICU. Similarly a population based retrospective study conducted by Usha Kiran et al. (2005) in the UK showed that maternal obesity is associated with new-borns' increased risk of admission to NICU. However, this study may not be representative because the rate of ethnic minorities was low and relied on old data collected between 1990 to 1999. In Kurdistan region, admitting new-born babies into NICU is based on certain guidelines. For instance, if a baby is born with certain types of birth defects that require no immediate or urgent medical attention, the baby is sent home. However, if the mother has relatives in the NICU the baby will be admitted without any medical indication. This could have affected the results of the current study. Blomberg (2013) criticises this practise and reports that the indications for admission to NICU varies widely and are mainly related to available resources and number of patients instead of being related to clear medical indications. Therefore, using this outcome to assess the benefits of an education programme may not be reliable.

In addition to that, there are varying explanations to the research findings regarding birth defects. The Kurdistan government often links this issue with the effect of chemical bombs when Saddam Hussein attacked the North of this region in 1988 (Barbati, 2013).

However, this hypothesis has never been substantiated. Therefore, it needs further exploration and scientific inquiry. Another explanation is that the study's sample size may have been too small to show any statistical significance so further studies with larger sample size is recommended.

Stillbirth

The results (see table 4.6) shows that the prevalence of still birth were almost the same between groups. This is contrary to the findings of Salihu et al. (2007) who reported that obese women had a 40% chance of having stillbirths compared to non-obese women. Similarly, the outcome of the systematic review by Chu et al (2007) found that obese women were at risk of having still birth. The same findings were found by a Danish study on 24,505 singleton pregnancies (Kristensen et al., 2005). The findings of the current study may have been affected by the fact that there was a misunderstanding over the definition of still birth in the region. The researcher noticed that some HCPs define still birth as a situation where the baby dies after delivery, while some others defined it as a situation whereby the baby dies after 28 weeks of gestation. It was clear that the HCPs lacked adequate knowledge on this subject and this may have resulted in some inconsistencies. The findings may have also been affected by the small sample size. There was no surprise that there is a lack of differences in rarer events as this relates to the fact that this is a feasibility study and the numbers are not sufficient to assess their sufficiency. This may change with a larger number of participants in a future trial. As the results in table 4.7 shows, the chances for induction of labour decreased with increasing attendance, indicating that attending the educational programme may have had some impact. So better attendance rates may have resulted in a different outcome (the reasons behind the poor attendance are discussed in the following section). Also, a larger sample size could have

improved the quality of the result as well as give better statistical power. Some of the data will have to be treated with caution due to reasons such as issues with method of data collection, poor standards and improper procedures by HCPs. Some information was retrieved over the phone and from people other than the participants themselves such as relatives or nurses. As such information was not from direct communication with the participants, it increases the likelihood that some of it may not have been entirely accurate. Also some of the HCPs were found to have engaged in poor practises such as using different weighing scales to weight new born babies thereby introducing a source of error in the measurement process (more discussion in limitations sections). A focus group was also conducted after delivery of the babies within 2-8 weeks. The aim of the focus groups was to explore obese women's experiences of an educational programme and their perceptions of its benefit to pregnancy outcomes. This essentially provided a forum to deliberate and find answers to why the educational programme did not appear to influence pregnancy outcomes among obese pregnant women. Many interesting points were discussed at the session. Six focus group discussions in addition to sixteen phone interviews were conducted from which themes around educational challenges and socio-cultural issues (some of which constituted barriers) were discussed.

5.4 Educational strategies, trials and pitfalls for transferring an antenatal educational programme from one country to another.

It is important that educational sessions are particularly designed to meet the needs of those being educated. Ho and Holroyd (2002) established invaluable insight around teaching strategies including how to organize antenatal teaching classes and delivering sessions by educators to meet women`s health needs. In the current study, during group discussion women focused on some sessions such as exercise during pregnancy and

labour stages. They emphasised their limited knowledge in these areas. It was clear also that prior to attending the programme, the women wanted further details about the session e.g the course outline. Similarly, an article by Stamler (1998) found that women wanted to know what to expect of hospital staff and what hospital staff would expect of them. Stamler implied that women were excited to attend antenatal educational programmes, to receive answer to their questions. It showed that women attended antenatal classes in order to learn how to behave appropriately during labour so they can operate successfully within the midwifery system. Essentially, the needs of female participants should be assessed and factored at the early stages of developing this kind of educational programmes in order to be able to provide women with valuable answers.

Nolan (2009) found that women did not attend classes solely to receive information; they also saw it as an opportunity to meet other women going through pregnancy at the same time, an opportunity which they really valued. For the current study, the topics discussed during the group discussion were very welcome by majority of the participating women. Particularly, when they shared the same experiences and discussed the same information relating to their health in small group discussions. Similarly, Little et al. (2013) stated that using antenatal group discussion as a teaching strategy for women during pregnancy will provide a platform of social support for pregnant women to meet and share their mutual experiences. Novick (2011) observed a positive feeling among the pregnant women who participated in an antenatal group discussion. The study conducted by [Hoddinott and Pill \(2000\)](#) suggested that the women who were old mothers were a source of constant support to those experiencing recent motherhood which created a feeling of confidence about their abilities to cope as new parents than the women without such exposure. Another study conducted by [Britton et al \(2007\)](#) which investigated antenatal information on

breastfeeding, found that experienced mothers are as effective as midwives in preparing women to breastfeed their babies and have added advantage of helping to build social support networks that sustain women through the early weeks of feeding. So, gathering women during educational programme might affect their feeling and is a window for new mothers to receive education regarding healthy diet and exercise from those women with previous experiences.

Williams and Booth (1985) indicated that group discussions are much more active events which encourage participants to express their thoughts unlike lecturing which is more passive and implies much more listening than opportunities to talk. In addition, Catling et al. (2015), in their study on group discussion and women`s experiences, stated that the participants in the group discussions experienced more comfort than the women who were assigned to the standard care.

Therefore, the evidence supports the use of group discussions as a good strategy for conducting antenatal educational programmes. This was further impressed upon the mind of the researcher while conducting this study. However, group discussion is not such a simple teaching method. It requires being able to facilitate, direct and manage a discussion among a group of people and this can sometimes be difficult or challenging. Some participants could be doing all or most of the talking leaving little chance for others to be heard. On the other hand, participants could be less interactive and engaging. Moreover, some of the sessions comprised women of different levels of education and socioeconomic status. These are the kind of situations that occurred during the focus group discussions and they required tact in handling in order to get as much input from everyone.

Group discussion could be regarded as a facilitative strategy in Kurdistan region which could save time and money. Catling et al. (2015) stated that group discussions have been implemented in low income countries successfully. This agrees with Jafari et al., (2010) who suggested that group discussions are suitable in a context where lack of support, restrictive cultural and traditional practices and low-quality healthcare services may mean that standard models of care are less effective or are as sought after by women. An example is a trial which was conducted in sub-Saharan Africa, which showed that group antenatal care is suitable and acceptable in low-literacy, high-human immunodeficiency virus (HIV) settings (Patil et al, 2013). Likewise, Logsdon (2003) stated that because of social support which result from group discussion, women were motivated to seek more antenatal visit which lead to fewer labour complications, higher Apgar scores at birth, intentions to breastfeed and a reduction in the risk of postnatal depression (Logsdon, 2003 cited in Catling et al., 2015)

One of the aims of the current study was to determine the effect of an educational programme (based on group discussion) on pregnancy outcomes among obese women. The hypothesis was that obese women who attended the group discussion would have better pregnancy outcome than those who did not. However, the quantitative findings did not show significant differences and rejected the alternative hypothesis. This is in contrast with what was found from the study by Massey, Rising, and Ickovics (2006), where adverse pregnancy outcomes such as preterm birth was reduced by antenatal educational programme employed via group discussion. They also stated that attending antenatal group discussion impacted positively and promoted behavioural change during pregnancy. So therefore, the teaching strategy used in the current study may have

contributed to the findings, as the women were happy about sharing their experiences with one another particularly those with similar experiences.

Dunkel-Schetter (2011) stated that another possible advantage of having group discussions during pregnancy is that it can help the women to be better prepared for labour thus reducing the stress that can contribute to adverse pregnancy outcomes such as low birth weight and preterm birth. It therefore follows that the group discussions in the current study may have contributed in motivating the women to take their antenatal visits very seriously. Attending their antenatal visits more frequently would mean that high risk women (e.g. cases of maternal obesity) could be identified more sooner, and that the women could be better prepared for labour. This would in turn have had its own added benefits such as helping them to prepare for labour.

During the group discussions, the women explored their needs, complexities, and their knowledge regarding the effect of long duration and frequent naps per day on their health as well as the effect of household electrical machine on their health (like the TV remote control). Such group discussions can be used to identify women who are struggling. Therefore, it can be recommended as a teaching strategy for those educators who want to develop an educational package in this region. The on-going ISIS related conflict in Kurdistan constituted a limitation to the group studies. Government officials were concerned about public gatherings both for security reasons (the security of the people) and for fears that people might be gathering to protest against the government. For example, the head of a health centre where the educational programme was run raised concerns about the purpose of the women's gathering. The conflict may have also affected the results of this study in other ways. Sommers (2002) reported that wars and conflicts tend to change the social and economic roles of the people in society. Families

and communities may lose members and absorb new ones. They may disintegrate or become deeply dysfunctional. In response, some children may become household heads, spouses, soldiers, or workers. Boys and young men may be sent to report on their family's holdings or search for work in a city, even if that means crossing into a war zone. Girls and young women may become domestics, young brides, and mothers. Roles and attitudes change as a result. These are among the lifestyle issues that can become a barrier for accessing social facilities and infrastructures like healthcare and educational.

Transferring the same teaching style from UK to Kurdish culture was regarded as a main pitfall by educator during the educational programme. Having attended several educational sessions in the UK, the researcher decided to use the same teaching style (student-centred approach) for this study. The objective was to encourage the women to talk and share their experiences. However, the findings of this study are that the participants had issues with the student-centred teaching style. They preferred a teaching centred style instead. This is mainly to do with the Kurdish culture where the teacher is viewed as the expert, an instructor and as such, the students would normally rely on the teacher to do all or most of the talking. Clifford (2015) argued that the student-centred approach cannot fit with all cultures. Michele Schweisfurth (2013), one of the leading authorities on student-centred approaches in the developing world, summarized a review of 72 projects attempting to promote these approaches internationally as 'a history of failures great and small'. The author identified some reasons for failure of student centred approach in countries where they failed as: (a) governments often have overly high expectations of such reforms and try to make the change too quickly (b) reforms in teaching aren't joined up with changes in the exam system and curriculum. (c) Practical problems such as classes of 50 and a lack of appropriate materials; and the last important

one is (d) cultural mismatch (Schweisfurth, 2013). Clifford (2015) stated that teaching approaches based on a Western idea of the individual don't fit well in cultures which emphasis group goals over individual needs. In such cultures, teachers are expected to be authoritative while the learners are required to be obedient.

The participants in the current study were quite sceptical of the student-centred teaching approach. They were unhappy that the educator (the facilitator of the session) was leaving them to do most of the talking. They felt the current educator was unscientific, had little knowledge to offer and instead wanted to learn from them. Their expectation was for the educator to do most of the talking and instructing them on the said topics. But teacher centred styles have their own disadvantages. Nolan (1998) argues that educators who adopt an authoritarian stance in their antenatal education were failing to help clients to make decisions. According to Nolan, antenatal education should be about helping the clients rather than treating them as children. The aim should be to help them understand the relevant issues, so they can choose what will be best for them and their babies (Nolan, 1998). Another disadvantage of the teacher-centred style is that it deprives the participants of the chance to disclose their thoughts as well as interact freely. An antenatal educational programme, which is based on a student-centred approach, has the potential to begin the process of empowerment, which may influence other aspects of the individual's life beyond the postpartum period. The advantage of this approach is enhancing the communication and assertiveness skills, so it will help to reduce the professional's boundaries, thus enabling further choice.

From the educator's perspective, the challenges with using the student-centred approach is that it forces the HCPs and midwives to become facilitators rather than just teachers. Thus, the interaction between midwives and client will overlap between clients' needs

and midwives` expertise. Wright (2011) describes the teacher centred approach as the situation where the teacher gives directives, makes decisions about what should be learnt and leaves little room for value of human experiences. So, in this approach there is no flexibility in teaching and participants usually listen to their teacher talk and play a passive student role. Therefore, to deliver an effective teaching environment, it is recommended that the learning style of the students should be considered. A suggestion for future education programmes like the one in the current study is to organise the women into small groups and give them a talk after which they may be given some time to reflect and discuss among themselves while the educator plays the role of a director, expert and teacher. This will make the educational programme more effective and more productive. As was observed in this study, implementing an educational approach from one culture to a different culture can be tricky. Cultural differences will have to be considered.

Teachers in Kurdish society are respected by their society. The results chapter showed that individuals in this region were culturally trained not to critique teaching methods in front of teachers as a sign of respect. As was clear from the group discussion where the current educator invited women comment on the programme. Women stated that the education sessions were fine and they stayed quiet. After many trials which have been made by researcher to make women feel free to explore their feeling regarding the educational programme but still they stated that the programme was good, without further comments. Consequently, the researcher had less chance to collect women`s critical comments on the educational programme. This is supported by Mhamad (2014) who reported that teachers have a crucial role in Kurdish society. If someone does not know a man`s name or has forgotten his name, the person is referred to as teacher, this is a sign of respect. In similar vein, a woman or a man is referred to and addressed as a teacher

when he or she is considered having done a good job. Referring to this person as a teacher is then an act of admiration and love. Criticising a teacher in Kurdish society is considered an act of disrespect.

The results of this study indicate that the participants preferred those sessions which used CD, power point, hand-outs and leaflets. Nolan (2009) points out that there has been considerable interest in recent years in the potential for transmitting information to clients using resources includes DVDs, CD ROMs, evidence-based leaflets, and posters. While Hannula, Kaunonen, and Tarkka (2008) concluded that the effective intervention programme for women to initiate breastfeeding early is the intervention which offers practical hand-outs. This is in contrast with a study conducted in the USA by [Risica and Phipps \(2006\)](#), which investigated women's educational preferences. The study determined that women prefer receiving information from a health-care professional involved in their care over and above any other source. This agrees with the findings of [Stapleton et al., \(2002\)](#) whose study included non-participants observation of 886 antenatal consultations and 383 in depth interviews with women and health care providers. The study explored the effectiveness of leaflets in promoting women's choice around key areas of pregnancy, labour and postnatal care. Despite the immense effort that had been put into providing the leaflets, they were unsuccessful in enhancing informed choice in childbearing women. Nolan, (2009) identified some limitations of using leaflets and hand-outs during antenatal educational programme among which is the fact that the women may sometimes want to discuss the content of the leaflets with health care providers but the health care providers have insufficient time to attend to every mother. Another crucial factor is the language of communication on the leaflet. Appropriate

attention will have to make to ensure that the leaflets are written in the language that can be read and understood by those who receive them.

The study result has showed that women in this region appreciated the use of audio visual aids. The women who enrolled for the programme were able to make use of the videos and films to learn about physical activities which were good for pregnancy periods. It can be said therefore that the women in this region value technologically based education. The indication is that such tools as CD and other recording and audio-visual gadgets may be used in educational programmes to help achieve behavioural change in this region.

In conclusion transferring an educational programme from one culture to another should be preceded by making careful considerations as to the social and cultural value and belief of the society. It should be adapted and implemented in such a way that fits as much as possible with the cultural norms and traditions of individual clients and families (Bawadi, 2009). In essence, such educational programmes should be tailored to meet the client's social and cultural needs in future larger trial.

5.5 Socio-cultural context

Whilst socio cultural issues were not the aim of the study, within the feedback in the qualitative arm of the study, women indicated socio cultural reasons for non-attendance which would need to be taken in to consideration in larger study. The current result of the study has also explored some socio-cultural factors which was considered as barriers for Kurdish women to access education and change their lifestyle during pregnancy. Kurdish women are afraid of people's response to their behaviours as a consequence they tried to behave appropriately to be accepted by their superiors like parents and teachers. This comes in line with the statement of Hardi (2005) who states that women in Kurdistan region were free coward and are afraid of people's response to them. Therefore, to

overcome these issues and to get the right comments on how participants feel toward the programme, the next educator should design the programme to accommodate an individual who is not part of the case study to evaluate the educational programme, since it is not possible to get the right answer from participants in front of the educator. For instance, if evaluating the programme had been conducted by HCPs instead of educator, the outcomes could have been different. So, cultural issues should be considered during evaluating an educational programme.

Regarding women's sources of information. The result chapter have shown that women usually rely on their family and friends and Mass media especially TV for information. This is supported by Nolan (1998) who stated that in the past antenatal education were offered like informal classes which orally transfers information from grandmother to their daughter and from one woman to another, but after 1950 the government asked midwives to start educational session as a part of hospital services. Similar findings were stated in the study by Sullivan (1989 cited in Choquette, 2007) who stated that pregnant women's primary resource of information regarding their pregnancy and labour were usually received from friends and colleagues. Choquette (2007) stated that, in the past women were advised by and received information from their grandmothers and mothers, and this form of knowledge transfer is still practiced among some cultures such as the Aboriginal population in Ontario where women receive information surrounding pregnancy from their grandmother in addition to providing support during and after delivery of the baby. The same sources are still used among women in Kurdistan region of Iraq. Nowadays, the sources of information regarding pregnancy is becoming the hospital's responsibility (Nolan, 1998). In Kurdish society there is a science called "Perezhnalogy" which is the science of old age women including mothers and in-laws transferring their knowledge to

their daughters about pregnancy and delivery. So, women in this region receive information regarding how to care for their babies' in terms of healthy eating and other activities from their family and friends, but the validity of information are not clearly addressed. As was clearly addressed by participants in the current study that they continuously receive the information from their family including mother-in-law, mother, sisters, cousin and friends. Therefore, it could be said that participating women might not have valued what the educator said because they have already received information from their family and friends, as such affecting the expected outcome of the study and therefore might have affected the results of the study. In addition to that, in Kurdish society information can easily be transferred among people. In the current study the women mentioned that the information which they received from the current educator has been stick to their mind and they start to think about transferring to other pregnant women like their friends and relatives. Furthermore, Martin et al (2013) used television as a source of childbirth information and the variety of scenarios shows offered may help build perspective in their pregnant viewers, as they seem to have done with some of the study participants who noted that "every pregnancy is different." Nonetheless, patients should be advised to corroborate the information they gain from this source. In the current study, pregnant participated women stated that they get used to watching TV programmes and also benefit from them. It is important for next educator to know that there are different sources of information in this region and the accuracy of information is not clearly stated, so this might affect the result of the study.

Kurdish society is regarded as a patriarchal society (Hardi, 2005), accessing women to attend the educational programme in this society is difficult. During group discussion women confirmed that advertising these kinds of session is very important before

commencing of the programme. They mentioned that it is the hospitals and health centres administration responsibility to advertise and contact pregnant women officially. As Nolan (1998) states in his/her book about antenatal education and empowerment, advertising can have pivotal role prior to an educational programme especially Mass Media (Nolan, 1998). Because of the nature of the study which was feasibility study where women randomly assigned into intervention or and control group, some women were invited and some not. As a consequence, when the researcher contacted those women who were assigned to the intervention group, families interfered questioning why the pregnant woman next door was not invited. It can be said that this can be count as a reason for bad attendance rate among women which lead them to have less chance to attend the session and decrease effect of education on their pregnancy outcomes. Therefore, involving men in patriarchal society like Kurdish society is importance to enhance attendance rate among women. However, in this region men usually attend Xwtba (religion talk on Friday). It could be said that using men during Xwtba time might affect attendance rate and also asking the leader to educate men on allowing their wife to attend the antenatal educational programme. In addition to that, delivering this kind of educational programme and advertising on TV might reach women better and could increase women`s awareness regarding the effect of obesity and its effect on adverse pregnancy outcomes.

In Kurdish society, people face constant interferences, especially women. Women face constant interference from their husband, family in-law and friends throughout the educational programme. As mentioned before, the Kurdish society is a patriarchal society, where society has male-dominated power structure throughout organized society and in

individual relationships, thus men have higher authority in decision making (Napikoski and Lewis, 2016).

Therefore, the recommendation for next educator is to find a way to have access to the family first, before proper planning and initiating any form of educational programme, to let them know the issues to be addressed and advantages of the educational programme. The research findings further suggest that women were unhappy regarding the time. It could be said that if the sessions are run in afternoon instead of morning, the attendance rate among women could have been higher. So, for the next educator it is important to select a suitable time for running sessions for women in this region to enhance the attendance rate. This finding comes in line with Nolan (1998), who stated that the time for holding antenatal education should be determined by women, since this could be a barrier for women not to attend sessions properly. Nolan (1998) provides the example whereby an educator in Edinburgh was running a programme for disadvantaged inner city population and realised that the low rate in attendance was due to the unsuitable time scheduled for the sessions. This led to a change in session scheduling by the educator resulting in a high rate of attendance. So changing the time of sessions to the afternoon as was recommended by women during the focus groups discussions. This could have impact on attendance rate among women to attend educational sessions consequently it may affect their pregnancy outcomes. A chaperone can be defined as a person who accompanies someone to a place (Cambridge, 2015). Jamal (2012) state that Pakistani women were restricted by their husband to stay at their home they cannot go outside without having a chaperone. So, similar cultural views can be seen practiced in Kurdistan. In the current study, the participating women complained that the place of sessions and its distance from their home was a barrier for their attendance because they have to find

a chaperone such as a sister; husband or in-laws to accompany them as a result most missed the session. Hence, it could be said that changing session schedule from morning to afternoon may increase women's availability and female members of the family to become a way mate for them in order to attend the session properly. Although, having chaperone during sessions disrupted the sessions many times, especially in-laws, because they complained about their daughters and sisters in law in front of other people. So, separating pregnant women from relatives is essential and to make additional parent education for relatives available during the sessions is recommended.

In addition, intervention over phone it might have impact of women in this case as relatives and place of education will not be a problem. This is in line with the study by Svensson et al. (2008), where participant women discussed the need for 24 hours pregnancy support telephone line as a strategy for improving antenatal education. Also, the current researcher noted that, women were more likely to offer feedback in telephone interviews than group feedback/ focus group. Although the focus group discussions highlighted that it would be better for the sessions to be run in the afternoon. However, the health administrator in health centres stated that due to a lack of service availability, having the sessions in the afternoon was not allowed. In order to get this, the educator needed a confirmation letter from the Director of Health (DoH) and the Health Administration at the Health Centres so as to offer health services and organize the conferences hall which is already available in each centre in this region. Women might feel better to attend the afternoon session because of some reasons. First of all, they are freer in the afternoon; Secondly, attending afternoon sessions feel like visiting friends and relatives, thirdly, they can find chaperone easily to come to centre not like morning

sessions where some women are unable because their husbands are at work, their sister and in laws are usually at university, school or busy at home with house chores.

This practise may affect women to not leave their baby at home and attend the group discussion properly so interviewing over phone might overcome this issue which is recommended for next educator.

There may be other reasons other than socio cultural reasons why women may be not attended. Such as women`s perception to antenatal classes, valuing of antenatal education. Like, Titaley et al (2010) conducted a qualitative study in three districts of West Java province. Concluded that financial difficulty, limited availability of health services, distances from health facilities, in addition to poor road conditions were major concerns, particularly for those living in remote areas. Lack of community awareness about the importance of these services was also found, as some community members perceived health services to be necessary only if obstetric complications occurred. In addition, women`s perception of pregnancy and they defined as a time for relaxing and gaining weight this may be another reason for not attending antenatal classes properly (Padmanabhan, 2015). Andersson et al (2013) stated that primpara women were more likely to attend antenatal education classes than multiparous women. Therefore, the current researcher proposed that offering alternative timing for the educational sessions as stated before is recommended. Delivering antenatal educational programmes via telephone interview or providing within the community could be suggested for further exploration

5.6 Weight management

As stated by Zangana (2005), Kurdish people place high priority on their properties like furniture, decoration of their house, mobile phones and cars more than their health. When an individual in this society is health conscious or undergoing behavioural changes, such individuals become an object of mockery and are thought of as running away from death and their belief that death is for the old is a contributing factor. For married individuals, they live with an adage that says “you tie your donkey” meaning ‘you don’t need to change’. Therefore, promoting awareness regarding the complication of unhealthy lifestyle will increase the people’s understanding on the its negative impact. The current researcher recommendation for the government is to help those educators who want to implement an educational programme in order to educate people regarding healthy lifestyle.

For change to be implemented successfully in this society, men have to accept the intended change first because as Kurdish society is regarded as an illustrative example of patriarchal society. The man is considered as the head of the family and does not participate in any house chores, as culture forbids it. There is a traditional expression for those men who help their women in house activities, they are regarded as “weak men” and considered scared of their wives and are made a laughing stock in the society especially among men.

In past and even till now, the main Kurdish problem is acceptance to change because they negate change and use religion and culture to validate their resistance to it. In addition, they apprise those persons whom uphold and live with the principle of their grandparent and great grandparent, however, some of these principles is not in accordance with the religion (Salim, 2003). They believe that everything is fated and destined, therefore, if a

women experience a difficult pregnancy outcome they immediately attribute it as being destined from God. Supporting their statements with an adage “life is not very important, don’t think too much of it, how it’s come let it come and don’t think too much if you think too much you will easily get older, neglect life as it’s God that knows everything” (Zangana, 2005).

According to Zangana (2005), a Kurdish physician who lived in Sweden, Kurdish people need self-esteem to change their attitude to achieve healthy lifestyle. He also stated that Kurdish people do not if they try to change. In this region, people usually relate diseases to malpractices of HCPs especially pregnancy and delivery, attributing health care providers and physician as responsible for disease without a person taking care of oneself, however, an individual has the responsibility to take care of oneself as a Kurdish saying “a person cannot clap with one hand” so we need to take care for our self in addition to HCPs care. A key step should be offering a session for women’s family before commencing the educational programme including information about the contents of programme and encourage family to support their wife in order to give birth healthily. In addition, there should be a telephone line support offer and women should be motivated to change by contacting them periodically.

Maintained behaviour can be seen more among Kurdish people. An example is seen where men place emphasis on how long their fathers lived despite being a smokers and believing that they will be like their fathers and that smoking is not as bad as it seems. Or they use a teacher or doctor as an example by saying “Why is this doctor or teacher a smoker, if it is really bad they would have given up”. These are Kurdish people most common belief regarding their health and changing their behaviour. They should be educated by the government through the use of mass media to enhance their

understanding and help them to change their behaviour. People easily adapt certain attitudes from their immediate surroundings either from friends, family and neighbour, therefore bad health style can be easily transferred (Zangana, 2005).

Zangana (2005) stated that people should not think about the commencing time of change they have to start whenever they are ready. Kurdish people say “it’s better to loose half rather than all” meaning start whenever you are ready don’t think about what is gone. In the current research, the result showed that there were no needs to keep on with the acquired behaviour learnt from the educational programme resulting in relapsed behaviour. Kurdish people usually return to old behaviour while they give up. Therefore, is advisable for the next educator to be careful regarding education context in this region because they easily return to their old behaviour.

Kurdish people give a lot of value to rest. They preferred to take rest in many occasion such as taking a 2 hours nap in the afternoon after returning home from work, getting sick, before travel, during pregnancy. In the past, Kurdish people were very busy people, as was mentioned in introduction chapter, as such, they usually take a short nap during the day. Nowadays, people are used to taking plenty of rest especially pregnant women. Women have conflict with the normal time for sleeping and napping they think that sleeping will provide good environment for baby health. Moreover, Family, friend even HCPs usually persuade women to take rest in order to have bigger baby which is valued in this society. As was clearly stated during group discussion, women were advised by doctors to not move too much and restrict her movement for the entire duration of her pregnancy. The reason for not moving among women is return to physicians who frequently advise women to not move too much because it could results into a miscarriage. As a result, women transferred this advice to each other and copied the same

behaviour of restricted movement during pregnancy. That might have affected the result of the study, contributing to weight gain during pregnancy. Another cultural issue is women`s view on food wastage, as it come from the Islam, the following is said, “*Eat – But waste not by excess: for God does not love the wasters (Qur’an, 6:141)*” for this reason, women try to avoid wasting food, even that of the children. When a child cannot finish his/her meal, the mother finishes it instead of preserving it for later use and as such has no control on her diet. In addition, pregnant women in this society are described as “Dw Gean” (with two lives), so they encouraged to eat more resulting to uncontrolled eating. Educating women regarding the healthy amount of food and healthy eating behaviour in this region is recommended through offering an educational programme on TV.

In focus group discussions, women expressed that the education they received during their pregnancy was quite helpful, especially the effect of healthy lifestyle and its impact on pregnancy.. Motivation toward changing healthy lifestyle and empowering women on how to cope during labour pain has been found helpful by participants and the programme found suitable. However, as discussed above, considerations to cultural issues need to be done beforehand. This finding is supported by Norris et al (2001), who stated that patient education through behavioural orientation can enhance patient empowerment and can contribute positively to outcomes such as quality of life and lifestyle changes. But tailoring of any educational programme should be suitable with the social and cultural characteristics of the target group. As National Institute for Health and Care Excellence (NICE 2010) emphasised on the need to utilise such programmes to improve patient outcomes. However, NICE also stressed that the success of such programmes depends on the personal and sociological background of patients, and that any such educational

intervention should be tailored to patient groups or individual's cultural and social characteristics (NICE 2010, cited in Attidge et al., 2014).

The health education should be culturally appropriate as stressed by Attidge and his colleagues (2014), that an intervention should be design to improve patient care for ethnic minorities, and then healthcare organisations need to take steps to facilitate its provision to ensure equality and fairness for ethnic minority populations. Therefore, when any educational services are planned, cultural background of clients should be considered. However, there is still a need to ensure that the content of what is being delivered is based on educational theory, it should be structured and shows evidence of effectiveness for the target population (Attidge et al., 2014).

As stated by Zangana (2005), obesity in Kurdish society regarded as a sign of health and wealth especially for women. A Kurdish adage says “one pound of meat is better than 100 witness” meaning that if an individual confirms that a woman is an obese or in their word “she is big” is enough as a witness to indicate beauty. Usually in Kurdish culture, when a man seeks a woman's hand in marriage, 2-3 family member are assigned to check on her physical appearance. In short, there are shops that provide medicine to gain weight. This cultural view might have affected participating women not to practise what the current researcher advised in order to improve their pregnancy outcome through behavioural change. There are many cultural issues which lead women to not be aware of obesity. After pregnancy, a woman has less changes to decrease their weight in Kurdish society, because the decision regarding having another baby is usually made by men not women. Another cultural issue is their clothes. Women usually wear long dress called “dshdasha” indoor, as such, will be unaware of weight gain. Also, men usually make decisions on their wives' images. From the religious point of view, women are not

permitted to expose their shape and posture of their body; as such men predict what they wear. A Kurdish adage saying “every part of a woman body is attractive so cover” meaning that women should cover appropriately especially pregnant women and exposure results in shame and disrespecting to family honour leading to gossiping. People in the Kurdistan region suppose this adage with an Islamic Narration by Abu Huraira: Allah’s Apostle said, *“Two are the types of the denizens of Hell whom I did not see: people having flogs like the tails of the ox with them and they would be beating people, and the women who would be dressed but appear to be naked, who would be inclined (to evil) and make their husbands incline towards it. Their heads would be like the humps of the bukht (very huge) camel inclined to one side. They will not enter Paradise and they would not smell its odour whereas its odour would be smelt from such and such distance.”* So this idea has rooted in the Kurdish culture and women are not allowed to wear revealing clothes, and as a result cannot identify how much weight they have gained.

5.7 Medicalization of Birth

In Kurdistan region, health care providers use different ways to put birth under their power, by creating a situation that will put delivery under their control as was discussed during the focus group and phone interviews. As a result, women start to visit private doctors from the beginning of the pregnancy, which will provide a referral pass to be used in hospital, without which women would be neglected by health care providers. In contrast, for those women who do not visit private doctors during the pregnancy, they might be ignored by health care providers during the delivery of the baby due to lack of referral from her private doctor. As a result women deal with pregnancy like a disorder rather than a normal situation.

Savage (2007) states that health care providers intentionally take control of birth which could be either by redefinition of birth, medicalization and frightening women with the aim of referring them to private hospitals. Savage also itemised that women were persuaded by HCPs to not wait for their normal birth, as they regarded as a something in past when that time women were very hard worker. As a result women discuss the type of delivery with their husbands and family. Therefore, the number of caesarean section increased dramatically in this region, as evident in the quantitative result section. It could be said that women in this region idealised caesarean section, therefore educating them regarding the complication of caesarean section is of high priority. This might be regarded as a factors which has effect on the current study result.

As Savage (2007) stated, medicalization of birth results women`s psychological and social aspects of birth and birth care by HCPs are neglected, which contributes to the pregnancy outcome. As such is crucial to consider psychological and social wellbeing of pregnant women. However, the medical profession persists on seeing these psychological and social elements as marginal and deserving attention only after birth. In delivery suit in Kurdistan, little room is given to psychological and social aspects of pregnancy. Women usually receive little to no compassion by their HCPs. In one instance, when the researcher was a clinical instructor in a delivery suit, she experienced situations where pregnant women were treated violently by HCPs especially when physicians converse with women in a very rude manner and they look down and discriminate on women with low socioeconomic background, as these women can be distinguished by their way of dressing, particularly in governmental hospitals. Subsequently, women regard governmental hospital as ``a butcher shop`` where there is no room for kindness as. As a

consequence, they preferred giving birth in private hospitals and borrowed money from relatives to pay the private fees. In addition to that physicians were intentionally frightened women which is opposite to idea of Dick Read and Lamaze who advocate similar strategies regarding women preparation for delivery and they stated that a fear of the delivery will cause women to feel more pain. Ministry of Health and Directorate of Health should provide a rule, regulation and policy for those one who want to frighten women without reasons. This is opposite to Bak (2003) who stated that it is crucial to educate women during pregnancy to how to cope with labour pain, and he stated that women should not be frightened, otherwise women who were not educated toward their delivery they will face a more difficult and longer delivery (Bak, 2003). HCPs asked for extra money (bribe), particularly at the birth of baby boys. That is why most women in Kurdistan region prefer to deliver their baby at private hospitals, but delivery in private hospitals has proven to entail higher chances of having a Caesarean delivery. The health director has to put strict rule in order to interrogate those providers who abuse women. Because the same HCP are working in private hospital but they treat women differently in these contexts.

Educating women regarding birth process and what happens to their body during pregnancy increases women's confidence and self-esteem. As a consequence, women will fear less and cope with the process more easily (Nolan, 1998). As it is supported by Rautava, Erkkola, and Sillanpaa (1991), which carried out a national project in Finland, women who were informed about childbirth were better able to cope than those who weren't informed. According to this study women were happy with the educational programme provided. Hence, offering educational programme for all pregnant women is recommended. Topics should include healthy lifestyle, simple exercise and childbirth

education. Nolan (1998) stated that some studies stated the effectiveness of antenatal education. Hetherington (1990) reported that a significant increase in a number of spontaneous deliveries and decrease in the use of analgesia among intervention group when compared to non- attended classes group (Nolan 1998). So giving education during pregnancy has been found helpful. In conclusion we can say that birthing process in Kurdish society is almost like producing a drama and the star of it is the doctors and birth attendants not the women. Health care providers, especially doctors have power over birth and birth care, they have power to control where births happen and how they happen. In conclusion, the power of the existing birth regimes in this region might be the causes for unsuccessful educational programme and unexpected outcomes. Bak (2003) stated that women were born with an innate ability to deliver normally. Therefore it is the responsibility of HCPs and prenatal educators to render educational programmes for women and their families to motivate women to deliver normally. Bak also regarded war, employment patterns, migration, and evolution of new family structure as disruptive factors for not delivering effective educational package. In this part of war which where there is a big conflict between ISIS and the Kurdish army it has affect women`s position. The effect of the political affairs and the government possibly did not allow people to gather. This made it more challenging for educators to gather and educate women, as gathering arose suspicion.

Women in this region were less likely to have a right to make decision on their mode of birth. Physicians have more right to make this decision. As Savage (2007) stated, loss of women`s right of having informed choices about her own pregnancy and birth is regarded as a result of medical power over birth. Half of informed choices are information: the information provided to pregnant and birthing women has been most inadequate and

always very carefully monitored by doctors. So receiving the right information about delivery and making informed decision is a woman's right. Withholding information from pregnant women, if presented or intended as protected is an abuse of medical power (Savage 2007). If the information they share causes women start to feel anxious then the doctors have to work with these women to cope with anxiety. However in Kurdistan, the opposite is the case, medical professionals use information, some of which might not be valid, to convince pregnant women to visit private hospitals and in return the hospitals provide commission inform of fees to the doctors for referrals.

5.8 SUMMARY

Pregnancy is described as a time for changing women's physical, psychological and social disposition (Rowlands et al., 2012). These changes coupled with the desire to have healthy pregnancy outcomes, are powerful motivating forces for women to engage in learning about selected health issues (Nolan 1998). Several authors (Phelan et al., 2011; NICE, 2006) have suggested that pregnancy is an ideal time to promote healthy lifestyle behaviour due to women's increased motivation to pursue a healthy lifestyle for the benefit of their developing baby. The researcher's interest in this subject arose primarily from her daily involvement as a clinical instructor at delivery suites and Maternal and Child health care centres. This study adopted a mixed method approach to explore whether an educational programme which was designed for obese pregnant women would result in improved pregnancy outcomes. This study used motivational interviewing as a tool for changing behaviour during educational sessions. Data were collected in different stages with different design. In terms of data about women's socio-demographic including age, level of education, women's occupation, first antenatal BMI, gestational age and obstetrics history which were collected through closed-ended questionnaires in

initial visit of women to the health centre. The second questionnaire, which was also closed- ended questionnaire, collected data relating to women`s pregnancy outcomes and women`s BMI before delivery of the babies. This questionnaire was conducted after delivery of the baby. The third questionnaire was a Likert scale which evaluated the education programme from the perspective of the participants. This questionnaire was collected in the fifth session. The questionnaire aimed to collect data regarding women`s self-evaluation of the educational programme and their perceived benefit to their pregnancy outcomes. Lastly focus group discussions were undertaken 2-8 weeks after delivery of the babies (postpartum) to collect qualitative data regarding women`s experiences of the educational programme.

5.9 Limitations and Strength of study

This study adopted mixed methods to explore whether an educational programme has effect on pregnancy outcomes and exploring women`s experiences of the programme. However, as in all studies, with hind sight it is possible to identify limitations and strengths which require attention and are discussed in the following and should be taken in consideration in future research.

Methodological consideration: According to Clark and Creswell (2014) who point out that the idea of mixed method or multiple methods in research design is come from the idea which all single method has bias and weakness, mixed method was used to neutralize weaknesses for each type of data. Therefore, the main strength of this study is the use of a mixed methods approach, where the researcher employed both quantitative and qualitative methods in order to provide a more complete understanding of the effect of educational programme on pregnancy outcomes and women`s experiences of this programme and its impact on pregnancy outcomes. Although the quantitative phase of

this study provided invaluable information about pregnancy outcomes among women including normal weight, obese women without intervention and obese women with intervention, the results didn't provide the expected outcomes. Conducting the qualitative phase of this study provided a more complete picture. The use of both approaches can present a full description of the interest area where reasons behind the failure of the quantitative arm of the study to significantly affect pregnancy outcomes could be explored using qualitative methods. This is evident in many studies (Sandelowski, 1995). In addition, the strengths of one single approach can defeat the weakness of the other (Onwuegbuzie and Johnson. 2004). For example, questionnaires in quantitative phase highlighted pregnancy outcomes among study sample whilst the reason behind unexpected outcomes of the quantitative phase was answered through the use of focus group in qualitative phase. An appropriate statistical test was chosen for the quantitative phase based on the level of the data and the normality of the distribution (Field, 2013).

Researcher role as a data collector: one of the strengths of this research was the involvement of the researcher during data collection which gave much or great validity and accuracy of data. However this involvement also has a number of limitations, for an example, for illiterate women who were not accompanied by educated relative, the researcher provided assistance and helping them in filling the Pre- Study questionnaire this maybe for issues for bias. On other hand, involvement of different individual like HCPs, relative and participated women as a source of data collection during conducting Post Study questionnaire were also regarded as the main limitations of the current study. Because of family commitment, and some cultural and social issues the researcher was not able to attend the delivery session of participated women so resulting in collecting data from different perspective over phone. As were stated in literature and methodology

chapter, data from different people will not provide researcher with accurate and valid data however, the researcher was aware with this issues throughout data collection process. For future research, including HCPs in research process is recommended.

Focus group was another tool for data collection used in this study. The researcher used the first focus group as a pilot then final form was constructed. Availability for researcher as a director for group discussion has many strength and limitation. The main strength was that the researcher can help the discussion to become more productive and she had knowledge regarding the first arm result and tried to ask a lot of questions regarding barriers for not attending the session properly. On other hand, there are many limitations such as in Kurdish culture, criticizing teacher and its teaching process is not culturally acceptable, the researcher has less opportunity to get rich data regarding best teaching package in this culture. Apart from that, during group discussions the researcher faced many challenges. For example, the cultural context in this region of Kurdistan, women are usually unable to express their feeling and speak out on health problems in front of other women, this part which will be discussed broadly in the next part of this chapter. So to overcome this issue, conducting indepth one-to-one interview is recommended for future research which may positively impact on the outcome of study. As well as involving independent person for conducting an interview is recommended

On other hand, several strengths of the study were: firstly, the originality of the study regarding the feasibility of an educational programme and their effect on pregnancy outcome among obese pregnant women in Kurdistan region. Such research is very scarce in this region particular with obese pregnant women.

Secondly, using mixed method is other strength of current study. Other strength of this study is the design of the study which used, using randomization, in the first arm of the

study aimed to find out the effect of an educational programme on pregnancy outcomes in three centres of the large city in Kurdistan region of Iraq. Randomization is regarded as a gold standard to assess interventions. However, a larger sample size is recommended for future study. Regarding pilot study: conducting pilot study before conducting any data collection tools was also regarded as the main strength of the current study which were stated in methodology chapter. The researcher started each data collection steps with small pilot study to ensure the problem with each one and how deal with research aims, which have overcome number of problems such as time needed for each questionnaire, reliability and validity of them.

Despite the fact that parametric tests are usually more robust (Robson, 1997), the circumstances obliged the use of non-parametric tests since the data was distinctly non-normally distributed. Nevertheless, non-parametric tests have the advantage of being simpler to compute, require fewer assumptions, can be used more broadly, and have powerful efficiency (Robson, 1997). For the qualitative phase, thematic analysis was chosen; such an approach is simple and useful for identifying, analysing and recording patterns (themes), more so, it will gives rich and complex description about the data (Braun and Clarke, 2006).

5.10 Recommendations for further research

The recommendations for future research are:

- To have a large randomised control trial with increased sample size to give statistical power. To do this an accurate prevalence rate for GDM in Iraq is needed. This will be useful in having a better understanding of the efficacy of the educational programme. Motivational interviewing as a tool for existing intervention programmes could also

be used to achieve behavioural change in cases such as smoking. This may be an area worthy of further exploration.

- The researcher has to design the education package carefully in terms of culture, political and society context. There were some mothers who declined to participate in the study. One reason for this refusal was because of cultural barrier's they didn't motivate women to take part this kind of research. Women in Kurdish society are not permitted to go outside the home alone. Thus, future research must be carried out with this in mind and preparation including making consideration about cultural issues in this region is crucial for a future trial.
- In addition, there is a need for education about antenatal education ANE for society especially for the husbands whose wives are taking part in ANE. This would suggest that the materials prepared to explain the study need to take the husbands' perspective into account and perhaps the research team need to engage with the husbands to ensure they feel they can support their wives.
- Consider flexible times for women to attend the educational sessions which fits with women's schedule. Providing evening sessions for Kurdish women may especially be successful.
- Conducting an evaluation of the programme was not successful, given the cultural view of a teacher in this region. The culture is such that a teacher is seen as a respected figure who should not be criticised. It was therefore difficult to get the participants to identify the teacher's weaknesses while the teacher was present. So using health care providers instead of teacher for future research may address this issue..
- Conducting interviews instead of focus group might be better because Kurdish women tend to feel shy about expressing their feelings and experiences in front of

other women during discussion. This will also help the researcher get more detailed experiences from women regarding the efficacy of educational programme on their pregnancy outcomes and the barriers for not attending the sessions.

- Learning from this study for undertaking a future trial.
 - ✓ This present study used a student-centred style to execute the educational programme. At the end of the study, the researcher realized that the teacher-centred approach could have resulted in better outcomes because of the student centred approach was not effective in this context.
 - ✓ Individual education sessions interview might be better than group sessions because of the problems experienced with women unwilling to participate in discussion in a group context. This related to their cultural norms of quiet behaviour being ideal and experiences of war making them cautious to speak outside of the home.
 - ✓ Using health care professionals instead of the researcher for conducting evaluation of the programme could have resulted in getting better information as teacher is respected in this regional context.
 - ✓ Conducting power calculation and including larger sample size to show statistical power is essential. Before deciding on including a group of normal weight women, it is better to match for confounding variables especially for women's age, educational level and parity. The sample size calculation is based on the primary outcome of the trial (gestational diabetes), it is difficult to undertake RCT in this time without an accurate prevalent rate for gestational diabetes in Kurdistan region of Iraq.

- ✓ Regarding the timing for running education sessions, conducting educational classes in the afternoon or evening might affect attendance rates.

5.11 Contributions to Knowledge

This research project contributes to knowledge regarding pregnancy outcomes among obese pregnant women living in the Kurdistan region. Prior to this research what was known was the following:

- 1) Obesity is regarded as a significant global health problem (Campbell et al., 2011)
- 2) Obesity during pregnancy is linked to adverse pregnancy outcomes for mothers and new-borns (Smith et al 2013)
- 3) There is a limited evidence base regarding effective intervention strategies for obese pregnant women (Muktabhant et al., 2015; Dodd et al., 2014).

Prior to this research, no evidence was available regarding the effect of obesity on pregnancy outcomes among obese pregnant women in Kurdistan region of Iraq. This study has also contributed to the literature around obesity, Kurdish women and trends of lifestyle in this region. This can be elaborated in the following points;

1- National level:

This thesis highlights the cultural perception of obesity during pregnancy in Kurdistan. It touches on how the culture considers weight gain among women as a sign of good health and beauty. And how in the case of pregnant women, weight gain is seen as good for both the nursing mother and the unborn child. This thesis gives a picture of the role of women in this society and how their responsibilities increased when they become mother. Therefore, this study added to the literature around Kurdish cultural views toward obesity. Obesity is regarded as a sign of wealth, health and beauty. The study has also identified

that obese women are starting to feel embarrassed about their weight and desire to change their behaviour.

2- Local level; the findings of current thesis will add to the literature around the role of women in Kurdistan. Women's role was found as a main barrier to not attend their medical appointment properly. It also added that Women in this culture were enthusiastic about being educated about childbirth, which is a new findings for this part of the world, and could be used to supports its development as part of the health care provision for women. So tailoring an educational programme should be based upon women`s need. The implications of this for hospital care are that care and health education needs to be tailored for specific groups.

3- Individual level: A key contribution of this research is demonstrated that obesity during pregnancy has impact on GDM, in addition to that this research support the findings of others, that obese women in intervention group gain less weight than women in control group during in pregnancy. This is regarded as a new finding for developing countries like Iraq.

4- Health Education in Kurdistan: this thesis shows that it is not possible to simply lift a UK model of health education and drop it into the culture of Kurdistan. The educational programme content, teaching style and delivery need to be adapted to meet the needs of different cultural groups. This study supports the findings of others (Clifford, 2015) who stated that there are trials and pitfalls for transforming an educational programme from one country to another particularly where the cultures and teaching styles are quite different. This study also added literature that, government officials were concerned about public gatherings especially because of the war/conflict situation in Iraq (as mentioned in

the discussion). Future research comprising educational programmes of the sort in this study will hence have to take this into consideration when designing such programmes.

In addition to that, there were several areas of the research that made a unique contribution to knowledge: trial design (including feasibility and choice of outcomes) in a new setting, experience of carrying out a trial in the Kurdistan region of Iraq, the feasibility of antenatal educational programme in this region, the impact of the organisational culture on women to attend the antenatal classes in region, and the impact of culture on the research process in Kurdish setting. The research indicates that a large scale trial of antenatal educational programme would be feasible and acceptable in Kurdistan region. Potential issues relating to culture would impact on a large scale trial and discussion of these indicates potential areas of improvement. The first of these is acceptable teaching strategies in this setting. Issues related to the data collection process and methods which causes difficulties for researcher during the session.

This longitudinal study is one of only a few that was found to have explored women`s views and experiences regarding their perceived benefits of the programme and pregnancy outcomes. So its findings contribute to the body of knowledge on the experiences of obese women. Inconsistencies in what women viewed as the benefits of the educational programme and their perceived outcomes were discovered. Furthermore, the common sociocultural issues which constituted barriers to attending the educational programme were explored and can be added to the body of literature regarding the barriers for not attending interventions.

In addition, the study identified some questionable practise found among HCPs e.g. engaging in actions to purposely scare women into seeking treatment from private hospitals for selfish reasons. As there is a scarcity of research driven interventions seeking

to tackle behavioural changes among pregnant women, interventions which focus on “healthy pregnancy” including healthy diet and physical active intervention should be considered.

5.12 conclusions

This feasibility study explored whether an educational programme which was designed for obese pregnant women would result in improved pregnancy outcomes. Motivational interviewing as part of the education programme was used as a tool for encouraging women to change their behaviour. Quantitative and qualitative data were collected. The quantitative approach provided a snapshot that could apply to the larger population from which the data were collected. The qualitative data provided a more in-depth and a wider pool of information. This data helped clarify and provide insights into issues to which quantitative analysis could not provide much direct access. A qualitative approach is especially valuable when one is studying a sensitive topic like obesity, women and culture.

This study found that even with the small sample size used in this feasibility study, the differences between the randomization groups was statistically significant (p value = 0.02) in regarding to GDM. To conclude, improving behaviour during pregnancy requires motivation and further research is needed on healthy pregnancy programmes which may be suitable. In conclusion the researcher found that the educational programme made small differences to pregnancy outcomes in this region. Women’s perceived benefit and limitations of the education programme suggest that various social and cultural issues which acted as barriers prevented women from maximising the benefits of the programme, which may have affected results. There is a need for people to learn about obesity and its complications. Educational programmes such as the one that was used in

this study will help in this regard and will ultimately be useful in improving the general view of obesity. Delivering more programmes like this may promote them and improve attendance rate and make in turn result in improvement in pregnancy outcomes..

The intervention programme was welcomed by the women. The antenatal education programme made a small difference to maternal outcomes with respect to gestational diabetes. The prevalence of GDM was reduced in women who accessed the programme suggesting that GDM could be decreased by educating women during pregnancy regarding healthy diet and exercise. One factor which may have affected the results of this study was the low attendance rate among women who were randomised to receive the education programme. A higher rate of attendance at education classes may have improved outcomes in others areas. Reasons for poor attendance were women's roles within the home and lack of support from the family. This suggests consideration needs to be given to promoting antenatal education in the region, as it is currently not available and not valued by the society. Further research with larger sample size is also needed. This study is useful in understanding the difficulties and issues that may arise during implementing an educational programme for Kurdish women in the region. This study also identified the need, particularly in the less developed worlds, of ways to improve the health of obese pregnant women through educational programme. Also, understanding teaching frameworks and teaching style is very important for educators who want to implement an educational package for this particular cultural group. Insights into the values of culture, educational theory, and teaching strategies will certainly be useful in designing and developing effective educational programmes. However, this study indicates that educational programme has proven to be acceptable in developed countries and had made some differences on pregnancy outcomes where the studies have been

done. However, none of the studies appear to have been conducted in a war-torn area and in a cultural that women are faced a lot of cultural and social barriers. Thus, the proposed study will be important to deal with these barriers in the beginning of the programme.

5.13 Summary of the chapter

This chapter started with discussing the main research findings of quantitative and qualitative arms of the study to pilot whether an educational programme which was designed for obese pregnant women would result in improved pregnancy outcomes among obese women and comparing them with control group of obese women. The researcher presented supporting evidence which both agrees and disagrees with current study findings, subsequently providing answers to the research questions, and aims. Contextualizing the current research findings in existing literature showed the researcher why the research hypothesis was not accepted. In addition, the researcher tried to discuss the women`s experiences regarding the education outcomes and its perceived benefit on pregnancy outcomes. The study closes by discussing its strengths and limitations, contributions to knowledge. Finally, it concludes and gives recommendation for future researchers and policy change.

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